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Manuscripts (two copies if possible), typed double-spaced on one side of the paper only with margins at top and left-hand at least 2.5cm wide, should be submitted. Latin names of genera and species, but nothing else, should be underlined. S.I. Units should be used wherever possible. Authors must ensure that their references are accurately cited, and that the titles of the journals are correctly abbreviated. Volumes of *The Naturalist* for the years 1886 to 1975 have been retrospectively numbered 11 to 100 to accord with numbering before and after this period (see YNU *Bulletin* no. 3, pp. 21-22 1985); please cite these volume numbers in all references. Table and text-figures should be prepared on separate sheets of paper. Drawings and graphs, drawn about twice the linear size they are to appear, should be in jet-black Indian ink, and legends should not be written on the figures. **Publishable manuscripts not conforming to the above requirements will be returned for alteration.**

Photographic Plates

Readers of *The Naturalist* will have noticed that the number of photographic illustrations has increased in recent years. Good clear photographs, suitably captioned, to accompany articles or as independent features are always welcome.

To encourage this development, a long-standing member of the YNU, who wishes to remain anonymous, has most generously offered to make a donation, the income from which would finance the publication of a plate or equivalent illustration in future issues whenever possible. The editor, on behalf of the YNU, wishes to record this deep appreciation of this imaginative gesture.

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THE BEETLES OF SPURN PENINSULA: AN UPDATE

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The Beetles of Spurn Peninsula (Denton, 1995) is an up-to-date assessment of the known beetle fauna of this important Yorkshire Wildlife Trust reserve. This work brought together the results of surveys carried out by the YNU Entomological Section during the years 1947-1953 (organised by the late W. D. Hincks) and that of work by a number of coleopterists during the decade and a half leading up to its publication. By the end of the period a total of 689 species of beetle had been reliably identified from the Peninsula.

One of the interesting aspects of publishing a report on any Natural History order is that it can stimulate recorders to search their archives and bring forward unpublished data. *The Beetles of Spurn Peninsula* is no exception, and Dr R. C. Welch has been kind enough to supply a wealth of information regarding a visit he made in late July 1963. Similarly, R. J. Marsh, having now put all the Yorkshire coleoptera records in his charge on to computer, has been kind enough to supply details from this archive.

Works of this nature also tend to generate an interest in the area concerned and ongoing work by various coleopterists, including the author, has resulted in records which have added to the known distribution or, in some cases, added new species. A thorough search of the literature has also revealed several hitherto unknown records. The following list documents those findings and brings the Spurn List of Coleoptera up-to-date. All locality names mentioned below will be found on the maps in *The Beetles of Spurn Peninsula* with the exception of Kilnsea Church which is adjacent to the northern edge of the reserve some 100 metres to the east of the 'Crown and Anchor'.

In compiling the list which follows I am greatly indebted to the following collectors and recorders: the late E. G. Bayford (EGB); P. A. Crowther (PAC); J. H. Flint (JHF); the late W. J. Fordham (WJF); the late W. D. Hincks (WDH); C. Johnson (CJ); R. J. Marsh (RJM); the late E. J. Pearce (EJP); the late S. Shaw (SS); B. R. Spence (BRS); the late T. Stainforth (TS); the late W. O. Steel (WOS); the late G. B. Walsh (GBW) and R. C. Welch (RCW). The initials 'MJS' remain untraced.

As few voucher specimens have been traced it has not been possible to apply a critical standard of verification and in most instances the identification must remain with the original entomologist. With the addition of 31 new species and the deletion of *Leiodes dubia* (Kugelann), the Spurn List of Coleoptera now stands at 719. Nomenclature follows Pope (1977) or more recent revisions.

Leistus ferrugineus (Linnaeus). A single found under driftwood at the entrance to the Heligoland trap at 'Wire Dump' on 12/5/96 (PAC) adds to the known distribution. The only previous records were from the Warren, Main Ridge and the Point (including the dunes).

Notiophilus biguttatus (Fabricius). A single from under a log beneath an elder *Sambucus nigra* bush at the Point on 23/7/63 (RCW) adds to the known distribution. The only previous records were from the Warren, the 'Blue Bell' and Chalk Bank.

Dyschirius globosus (Herbst). A single located on mud at the edge of the 'Bomb Crater' on 23/7/63 (RCW) was the first record since specimens were found in the 'Canal Zone' during the initial survey.

Trechus quadristriatus (Schrank). A single in the Point dunes on 23/7/63 (RCW) adds to the known distribution. The species had previously only been encountered as far south as the salt marsh at 'Wire Dump'.

Bembidion fumigatum (Duftschmid). During the years of the initial survey the species was present in the *Phragmites* marsh. This area is no longer extant, and the only record since this time concerns a single under seaweed (exact location unknown) on 20/7/63 (RCW).

Bembidion normannum Dejean. Four specimens encountered on mud at the edge of the 'Bomb Crater' on 23/7/63 (RCW) constitute the fourth record and the first since 6/51.

The other records were from the 'marsh meadow' and the 'Canal Zone'.

Bembidion genei Kuster. There are three previous records: around 'Pallas's Pond' in 6/50 and unknown locations on 14/8/49 and 20/7/63. It is now known that specimens, collected independently on the last mentioned date and also the following day, originated from mud along the waters edge of 'Boundary Dyke' (RCW *pers. comm.*).

Bembidion iricolor Bedel. Specimens found on mud at the edge of 'Pallas's Pond' on 21/7/63 (RCW) constitute the second record since the initial survey. All other records were from the Warren northwards.

Bembidion lunulatum (Fourcroy). Located on mud at the edge of 'Pallas's Pond' and along the edge of 'Boundary Dyke' on 21/7/63 (RCW). The only other records were from an unknown location on 14/8/49 and the 'marsh meadow' on 4/6/50.

Pogonus chalceus (Marsham). A single on the Humber shore at the Warren on 16/9/96 (MLD) was the sixth (and second recent) record. The others were from the salt marsh at 'Wire Dump' in 7/48, 9/49 and 6/50, the 'Canal Zone' in 8/49 and the 'Scrape Field' in 9 and 10/82.

Pterostichus niger (Schaller). The only records were from the Warren on 8/6/50 and 17/8/85. The species was encountered at the end of 7/63 but, unfortunately, no locality or collecting details are available (RCW).

Pterostichus nigrita (Paykull). A record of this species from the *Phragmites* marsh on 20/8/49 was questioned in light of recent splitting (Luff, 1990) and the lack of any voucher specimens. A single male on the mud at the edge of the 'Bomb Crater' on 23/7/63 (RCW) has been checked since this taxonomic revision and reinstates this as a Spurn species.

Calathus melanocephalus (Linnaeus). Specimens located under drift refuse and under a dead porpoise *Phocoena phocoena* along the coast (exact location unknown) on 21/7/63 (RCW) and a single found under decaying rhubarb leaves at the side of the Annexe on 16/9/96 (MLD) were the fourth and fifth records; the rest were from the Warren area. These records have been checked since the taxonomic revision by Anderson and Luff (1994). Past records from along the Humber foreshore (exact locations unknown) require confirmation on account of this splitting.

Agonum fuliginosum (Panzer). Specimens were located amongst reeds at the edge of 'Pallas's Pond' on 23/7/63 (RCW). This was the first record since being found in the 'Canal Zone' and the *Phragmites* marsh during the years of the initial survey.

Agonum moestum (Duftschmid). The only previous records were from the environs of 'Pallas's Pond' on l0/6/50 and the *Phragmites* marsh on 21/6/51. Specimens were found under stones (exact location unknown) on 20/7/63 (RCW) and amongst reeds at the edge of 'Pallas's Pond' on 23/7/63 (RCW).

Amara aulica (Panzer). Four specimens found under stones near the gentlemen's toilet of the 'Crown and Anchor' on 20/7/63 (RCW) brings the total number of records to five. The others were from the Humber shore (exact location unknown) and the Warren during the years of the initial survey and the Point on 29/4/92. This record is, technically speaking, 20 metres north of the recording area.

Amara bifrons (Gyllenhal). The only previous record was from the Humber foreshore (exact location unknown) on 17/7/48. Four specimens were located under stones near the gentlemen's toilet of the 'Crown and Anchor' on 20/7/63 (RCW). This record is, technically speaking, 20 metres north of the recording area.

Harpalus rufipes (Degeer). The only records were from the Warren area on 17/7/48 and 8/6/50 and the edge of 'Canal Scrape' on 20/6/90 and 2/5/93. The species was encountered at the end of 7/63 but, unfortunately, no locality or collecting details are available (RCW).

Harpalus rufibarbis (Fabricius). Previously encountered at an unrecorded location during 1919 and, within the last decade, on the Humber shore at the Warren and near the 'Canal Scrape' hide. Additionally, specimens were located under a stone near the gentlemen's toilet of the 'Crown and Anchor' on 20/7/63 (RCW). This record is, technically speaking, 20 metres to the north of the recording area.

Harpalus affinis (Schrank). Examples located in the Point dunes on 23/7/63 (RCW) add to the known distribution. The species had previously only been encountered as far south as Chalk Bank.

Harpalus latus (Linnaeus). Specimens found under drift refuse (exact location unknown) on 22/7/63 (RCW) bring the total number of records to four. The previous records were from the Point on 3/7/66, on the road south of the Warren on 1/5/93 and on the Humber shore south of the Warren on the same date.

Stenolophus mixtus (Herbst). Examples located on mud at the edge of the 'Bomb Crater' on 23/7/63 (RCW) constitute the first record since several examples were found in grass roots at the Warren in 6/50 and 6/51.

Badister bipustulatus (Fabricius). Formerly recorded from the Warren, Main Ridge, 'Canal Scrape' and the salt marsh at 'Wire Dump'. Records from the Point dunes on 7 and 9/4/95 add to the known distribution (PAC).

Chlaenius vestitus (Paykull). A single female found in a light trap in the field adjacent to Kilnsea Church on 7/6/96 (PAC teste MLD) constitutes the first record for the Peninsula. This record is, technically speaking, 20 metres to the north of the recording area.

Haliplus apicalis Thomson. There is a record on the YNU database of this species occurring at Spurn (exact location unknown) on an early 20th century date. As this record was prior to the realisation that genitalia dissection was necessary for identification and, as no voucher specimens are known for confirmation, the species has not been admitted to the Spurn List.

Dytiscus circumflexus Fabricius. A single male was located in the 'Bomb Crater' on 19/8/70 (EJP). This is the fourth record and the first since 1951. The others were from the 'Canal', the 'Bomb Crater' and the pond near the Humber shore.

Gyrinus caspius Menetries. Three specimens were located in the 'Bomb Crater' on 23/7/63 (RCW) and examples were found in an unrecorded location in 6/67 (JHF). The only other record concerned a single from the 'Bomb Crater' in 6/51. Generally confined to coastal drains, there are only three other Yorkshire records.

Gyrinus substriatus Stephens. Specimens from the 'Bomb Crater' on 23/7/63 (RCW) bring the total number of records to four. The other records were from a static tank at the Warren on 14/6/47 and 'Pallas's Pond' on 21/8/49 and 1/7/93.

Helophorus brevipalpis Bedel. Originally encountered in the 'Boundary Dyke' and the pond near the Humber shore in 6/47 and the *Phragmites* marsh and the marram on the Humber shore near the Warren (exact location unknown) in 7/48. The only records since this time concern specimens located in mud along the waters edge of 'Boundary Dyke' on 20/7/63, in the Point dunes on 22 and 23/7/63 and on the edge of the 'Bomb Crater' on 23/7/63 (all RCW). The records from the Point dunes extend the species' known distribution.

Cercyon haemorrhoidalis (Fabricius). Specimens found in the Point dunes on 23/7/63 and in a dead rabbit *Oryctolagus cuniculus* (exact location unknown) on the same date (both RCW) constitute the first records since the initial survey. The previous records were from the 'marsh meadow', the *Phragmites* marsh and from a dead porpoise *Phocoena phocoena* on the Humber shore (exact location unknown).

Cercyon unipunctatus (Linnaeus). Examples found in pitfall traps in a rabbit *Oryctolagus cuniculus* burrow (exact location unknown) on 23/7/63 (RCW) constitute the second record. The other concerned specimens encountered under straw refuse in the 'marsh meadow' on 9/6/50.

Cercyon ustulatus (Preyssler). The only record was of specimens found in 'Pallas's Pond' on 10/6/50. The species was encountered at the end of 7/63 but, unfortunately, no locality or collecting details are available (RCW).

Berosus affinis Brulle, *B. luridus* (Linnaeus) and *B. signaticollis* (Charpentier). There are records on the YNU database of these species occurring at Spurn (at unknown locations) in the early 20th century (EGB). These are the only records for the Peninsula. All three species are afforded Notable B status, being thought to occur in between 31 and 100 10km squares of the National Grid.

Saprinus cuspidatus Ihssen. Five specimens found in a dead porpoise *Phocoena phocoena* at an unknown location on 23/7/63 (RCW) constitutes the first record for the Peninsula. Confined to coastal sandhills, the species is afforded Notable B status, being thought to occur in between 31 and 100 10km squares of the National Grid. This is the only Yorkshire record.

Saprinus semistriatus (Scriba). The only previous records were from carcasses during the summer months of 1947-1953 (exact locations unknown) and from cow dung in the 'marsh meadow' on 21/7/48. Four specimens were located in a dead rabbit *Oryctolagus cuniculus* (exact location unknown) on 22/7/63 (RCW) and a single was found under a dead Common Shrew *Sorex araneus* at the Point on 11/8/95 (PAC teste MLD).

Baeckmanniolus dimidiatus (Illiger). A single from a dead gull *Larus* spp. on the seashore (exact location unknown) on 4/5/74 (MJS det. MLD) was the fourth record (the second recent). The others were from the Point and Humber foreshore (exact location unknown) in the late 1940s and Chalk Bank on 20/6/90.

Ptenidium laevigatum Erichson. A single from the Humber Shore Clay Banks on 17/6/51 (SS) is in the Manchester University Museum collection and has been identified as this species (CJ *pers. comm.*). This is the first and only Spurn record.

Ptenidium pusillum (Gyllenhal). Examples collected by SS at an unknown location on an unrecorded date (most probably during the 1947-1953 survey) are in the Manchester Museum University collection and have now been ascribed to this species (Johnson, 1990). This record predates the only published record from Chalk Bank on 7/4/88.

Acrotrichis fascicularis (Herbst). Specimens in the Manchester University Museum collection, located at the Warren in 1950 (SS), have now been ascribed to this species (CJ *pers. comm.*). This is the first and only record for the Peninsula.

Acrotrichis montandoni (Allibert). Two examples from the Warren on 26/7/53 (WDH) are in the Manchester University Museum collection and have been ascribed to this species (CJ *pers. comm.*). This is the first and only Spurn record.

Acrotrichis sitkaensis (Motschulsky). Three specimens from the *Phragmites* marsh (two on 20/6/51, the other on 21/6/51) (SS) are in the Manchester University Museum collection and have been identified as this species (CJ *pers. comm.*). There are no other Spurn records.

Acrotrichis thoracica (Waltl). A single from the Warren on 26/7/53 (WDH) is in the Manchester University Museum collection and has been ascribed to this species (CJ *pers. comm.*). This is the first and only record for the Peninsula.

Leiodes dubia (Kugelann). Specimens were encountered in the Warren area on 4 and 7/6/50. This species, which was probably added to the British List in error, has now been deleted as all examined specimens standing as '*dubia*' have been found to refer to *L. rufipennis* (Paykull) (Cooter, 1996). In light of this nomenclature problem, and as no specimens are available for re-identification, the species has been removed from the Spurn List.

Leiodes ferruginea (Fabricius). Specimens found under a dead rabbit *Oryctolagus cuniculus* at the Point on 23/7/63 (RCW) constitute the first and only record for the Peninsula.

Liocyrtusa minuta (Ahrens). Examples were found at an unrecorded location on 4/6/50. In the light of past identification problems (Cooter, 1996), and the lack of voucher specimens for confirmation, the species has not been added to the Spurn List.

Agathidium laevigatum Erichson. A single on sand at the top of the beach (exact location unknown) on 20/7/63 (RCW) was the third record, the others being from the Warren on 4/6/50 and the sea cliffs at the Warren on 9/6/50.

Sciodrepoides watsoni (Spence). A single male in a carrion-baited pitfall trap at the Warren on 24/7/63 (RCW) constitutes the first and only record for the Peninsula.

Catops chrysomeloides (Panzer). A male in a carrion-baited pitfall trap at the Warren on 24/7/63 (RCW) was the second record, the first specimen having been found at the entrance to a fox *Vulpes vulpes* earth on the Main Ridge on 8/6/50.

Catops morio (Fabricius). The single previous record was of specimens located in a vole's nest and droppings at the Warren during the initial survey. The only subsequent record concerns two males and three females from carrion-baited pitfall traps at the Warren on 24/7/63 (RCW).

Nicrophorus humator (Gleditsch). This species was found to be a frequent visitor to the light trap at the Warren during the summer/autumn months of 1996 (PAC *pers. comm.*). The only other records concerned specimens from an unknown area in 7/11 and the light trap at the Warren on 19/7/53 and 20/5/93.

Nicrophorus vespillo (Linnaeus). A single in dead rats *Rattus* spp. at an unknown location on 24/7/63 (RCW) constitutes the first and only record for the Peninsula.

Thanatophilus rugosus (Linnaeus). Encountered abundantly on carcasses at the Warren, along the Main Ridge and on the Humber foreshore (exact location unknown) during the summer months of 1947-1953. Two specimens under fox *Vulpes vulpes* dung (exact location unknown) on 21/7/63 (RCW), a single in dead rats *Rattus* spp. (exact location unknown) on 24/7/63 (RCW) and a single from a dead fulmar *Fulmarus glacialis* on the seashore (exact location unknown) on 4/5/74 (MJS det. MLD) were the third to fifth records since the initial survey, the others being from Chalk Bank on 23/6/90 and 'Clubley's Field' on 31/5/92.

Scydmaenus tarsatus Muller & Kunze. Specimens located near the Lighthouse on 7/4/88 (RJM) constitute the first and only record for the Peninsula.

Lesteva pubescens Mannerheim. Examples from an unrecorded location in 5/28 (WDH) constitute the first and only Spurn record.

Bledius germanicus Wagner. Formerly encountered in a small colony in the banks of the pond in the *Phragmites* marsh in 6/52 and in the Warren area on 21/7/63. Additionally, a male and female were found in mud along the waters edge of 'Boundary Dyke' on 20/7/63 with a male and seven females being present there the following day (RCW).

Bledius opacus (Block). Three specimens from a dry sandy area (exact location unknown) on 21/7/63 (RCW) was the second record. The other concerned a very small colony which was present in the salt marsh at 'Wire Dump' in 6/47.

Platystethus arenarius (Fourcroy). Specimens from under seaweed (exact location unknown) on 20 and 23/7/63 (RCW) constitute the first records since a few specimens were located in wet places on the sea cliffs (exact locations unknown) in 7/52.

Anotylus maritimus Thomson. The records of examples under seaweed (exact location unknown) on 20, 22 and 23/7/63 (RCW) predate the only published record of a single in the salt marsh at 'Wire Dump' on 29/8/85.

Stenus nanus Stephens. A single female found on mud at the edge of the 'Bomb Crater' on 23/7/63 (RCW) constitutes the first and only record for the Peninsula.

Stenus providus Erichson = (*Stenus rogeri* Kraatz). A single found under decaying rhubarb leaves at the side of the Annexe on 16/9/96 (MLD) was the second record. The other, again of a single, was located under old straw in 'Clubley's Field' on 21/11/90.

Philonthus addendus Sharp. A single male from Chalk Bank on 19/11/91 (MLD) constitutes the first and only record for the Peninsula.

Philonthus sordidus (Gravenhorst). Specimens from the Point on 22/7/63 (RCW) add to the known distribution. The species had previously only been encountered north of 'Wire Dump'.

Philonthus varians (Paykull). Two females under a dead rabbit *Oryctolagus cuniculus* at the Point on 23/7/63 (RCW) add to the known distribution. The species had previously only been encountered in the northern half of the Peninsula.

Ocypus brunnipes Fabricius. Three examples found in the Point dunes on 23/7/63 (RCW) add to the known distribution. The species had previously only been encountered to the north of the 'Narrow Neck'. It is now known that the record from the Humber foreshore on 20/7/65, originally published as from an unknown location, was from the foreshore at the Warren.

Ocypus nero Faldermann. There is a record on the YNU database of this species occurring

at Spurn (exact location unknown) on an unrecorded date (EGB). This is the first and only record for the Peninsula. Indeed, there is only one other county record (Armholme in 1902). The species is afforded Notable A status, being thought to occur in 30 or fewer 10km squares of the National Grid.

Tachinus signatus Gravenhorst. Specimens from the Point on 21/7/63 (RCW) add to the known distribution. All previous records were from the Warren northwards.

Diglotta mersa (Haliday). During the years of the initial survey the species was located under stones below high-water mark, where it was particularly common near the salt marsh at 'Wire Dump'. Seven specimens found under stones below high-water mark (exact location unknown) on 22/7/63 (RCW) constitute the only record since this time. Spurn is the only known station for this species in Yorkshire.

Phytosus balticus Kraatz. A record of specimens under tidal refuse on the shore (exact location unknown) on 23/7/63 (RCW) is the first encounter since occasional specimens were located under seaweed, etc. on the Humber foreshore (exact locations unknown) during the years of the initial survey.

Arena tabida (Kiesenwetter). Specimens located in 7/63 were said to have been taken in a restricted area not previously worked owing to military occupation (WOS). It is now known that this area was at the Point, the species being found on the sandy beaches where it occurred under driftwood etc. (RCW *pers. comm.*). This is the only Yorkshire record of what is a widely distributed but very local coastal species.

Geostiba circellaris (Gravenhorst). The only records were of occasional specimens located in the *Phragmites* marsh and along the 'Canal'. The species was encountered at the end of 7/63 but, unfortunately, no locality or collecting details are available (RCW).

Atheta fungi (Gravenhorst). During the years of the initial survey the species was described as the commonest and most widespread Staphylinid on the Peninsula, occurring practically anywhere. Two specimens found under decaying rhubarb leaves at the side of the Annexe on 16/9/96 (MLD) constitute the fourth record since this time. The only localities to have yielded recent records are the Warren, the Humber shore at the Warren and 'Clubley's Field'.

Atheta celata (Erichson). A single male found under decaying rhubarb leaves at the side of the Annexe on 16/9/96 (MLD) was the first record for the Peninsula.

Atheta triangulum (Kraatz). Specimens located at Chalk Bank on 29/6/91 (RJM) constitute the second record since the initial survey. The only previous records were of occasional specimens from tidal refuse along the Humber shore (exact location unknown) and from grass cuttings outside Warren Cottage on 22/6/90.

Halobrecta flavipes Thomson. A single male was located under tide line refuse on the Humber shore at the Warren on 16/9/96 (MLD det. CJ). This is the first record since the 1947-1953 period when the species was described as being common and widespread under seaweed and tidal debris on the Humber foreshore (exact locations unknown).

Oxypoda umbrata (Gyllenhal). A single found in the Point dunes on 23/7/63 (RCW) adds to the known distribution. The only previous records were from reed debris in the *Phragmites* marsh on 23/7/48 and in a wet place on the sea cliffs (exact location unknown) on 12/7/52.

Aleochara binotata Kraatz. It is now known that the single female taken in dog dung among sand dunes on 23/7/63, originally published as from an unknown location, was from the Point dunes (RCW *pers. comm.*).

Aleochara bipustulata (Linnaeus). Past records from most areas along the Peninsula were questioned in light of recent doubt concerning the British species (Owen, 1990) and the lack of any voucher specimens. A taxonomic revision by Welch (1997) now allows a better understanding of this species complex. Examination of RCW's extant specimens has revealed the following records: two were found under seaweed (exact location unknown) on 21/7/63; specimens were located under a dead porpoise *Phocoena phocoena* in the 'marsh meadow' on 21 and 23/7/63 whilst on the last mentioned date 25 were found in the Point dunes (17 in dog dung and 8 in a dead rabbit *Oryctolagus*

cuniculus). The species can, therefore, be reinstated as a Spurn species.

Aleochara cuniculorum Kraatz. Specimens from a carrion-baited pitfall trap in a rabbit *Oryctolagus cuniculus* burrow (exact location unknown) on 23 and 24/7/63 (RCW) constitute the only records since the initial survey. There are only five other county records.

Aleochara lanuginosa (Gravenhorst). Four specimens (three in a dead rabbit *Oryctolagus cuniculus*, the other in dog dung) in the Point dunes on 22/7/63 (RCW) add to the known distribution. The only previous records were from areas north of the Warren.

Aleochara obscurella (Gravenhorst) = (*Emplenota alarum* Fauvel). The species was said to be common and generally distributed in and under seaweed etc. (exact locations unknown) during the years of the initial survey. Two females under seaweed at Chalk Bank on 22/7/63 (RCW) and a single from the Humber shore at the Warren on 16/9/96 (MLD) were only the third and fourth records since this time, the others being from the Humber shore at the Warren on 13/9/90 and the Humber shore near 'Black Hut' on 18/9/94.

Rybaxis longicornis (Leach). A single specimen from Chalk Bank on 29/6/91 (RJM) was the second record, the other being from the *Phragmites* marsh on 23/7/48. It is interesting to note that the species is still extant on the Peninsula as Denton (1995) suggests that the destruction of the *Phragmites* bed by coastal erosion will have caused the species' demise.

Geotrupes spiniger (Marsham). A single found dead on the road just south of the Warren on 15/9/96 (MLD) was the third record. The others were from the light trap at the Warren on 25/9/93 and horse dung on the roadside near 'Canal Scrape' hide on 24/7/94.

Geotrupes stercorarius (Linnaeus). The only records were from the Point (on a dead porpoise *Phocoena phocoena*) on 5/6/50, the *Phragmites* marsh on 11/6/50 and the Warren (in the light trap) on 15/9/93. The species was encountered at the end of 7/63 but, unfortunately, no locality or collecting details are available (RCW).

Aegialia arenaria (Fabricius). Encountered abundantly in a number of areas during the summer months of 1947-1953. A single from a dead gull *Larus* spp. on the seashore (exact location unknown) on 4/5/74 (MJS det. MLD) was the sixth record since this time, the others being from scattered locations along the Peninsula.

Aphodius fimetarius (Linnaeus). A record of this species at the end of 7/63 (RCW) was only the second. Unfortunately, however, no locality or collecting details are available. The previous record was of specimens from cow dung in the 'marsh meadow' on 22/7/48.

Aphodius foetens (Fabricius). The only record was of examples found in straw refuse in the 'marsh meadow' on 27/7/48. The species was located at the end of 7/63 but, unfortunately, no locality or collecting details are available (RCW).

Aphodius ictericus (Laicharting). Following the finding of this species in 1914 (exact location unknown), there were no other records until the end of 7/63. Unfortunately, however, no locality or collecting details are available (RCW).

Aphodius rufus (Moll). A record of this species at the end of 7/63 was only the third. Unfortunately, however, no locality or collecting details are available (RCW). Additionally, four specimens were located in a light trap in the field adjacent to Kilnsea Church during 8/96 (PAC). The only previous records were from cow dung in the 'marsh meadow' on 22/7/48 and in a portable light trap near the Lighthouse on 20/8/94. The records from near the Church are, technically speaking, 20 metres to the north of the recording area.

Phyllopertha horticola (Linnaeus). There is a record on the YNU database of this species occurring at Spurn (exact location unknown) in 1903 (TS). This is the first and only record.

Elodes marginata (Fabricius). Specimens from an unknown location in 5/28 (recorder unknown) constitutes the first and only record.

Agriotes acuminatus Stephens. The record from an unknown location in 5/28 (WJF)

predates the only published record of a single in 'Clubley's Field' on 31/5/92.

Anobium punctatum (Degeer). Formerly recorded from the Warren area and the 'Blue Bell'. With the exception of many dead specimens located in a sycamore *Acer pseudoplantanus* in the Warren garden in 6/50 all others were found under synanthropic conditions. The species was found in profusion in 1976 when the lifeboat cottages (just north of the entrance to the Point) were being demolished (BRS). This record therefore adds to the known distribution. Freshly dead specimens found in Warren Cottage and the Ringing Laboratory at the Warren on 20/9/96 (MLD) confirm the species' continued presence.

Necrobia violacea (Linnaeus). A single located on an old bone on the coast (exact location unknown) on 21/7/63 (RCW) was the first record since examples were found in carcasses along the Humber foreshore (exact locations unknown) on 17/7/48 and 4, 5 and 7/6/50.

Epuraea aestiva (Linnaeus). A male found in a pitfall trap in a rabbit *Oryctolagus cuniculus* burrow (exact location unknown) on 23/7/63 (RCW) was the first record since specimens were located in the 'marsh meadow' and the Warren area during the years of the initial survey.

Cryptophagus dentatus (Herbst). Male specimens from Chalk Bank on 29/6/91 (RJM) constitute the second record, the other being of a single male found under old straw in 'Clubley's Field' on 27/12/82.

Cryptophagus distinguendus Sturm. Examples from an unknown location on 25/6/91 (RJM) constitute the second record. The other concerned a single from vole droppings at the Warren on 19/7/48.

Cryptophagus setulosus Sturm. A male and female in a pitfall trap in a rabbit *Oryctolagus cuniculus* burrow (exact location unknown) on 23/7/63 (RCW) constitutes the second record, the other being of five specimens in the nest of the bee *Bombus agrorum* at the Warren on 8/6/50.

Micrambe lindbergorum (Bruce). This species was described as new for Britain when singles were located at the Warren on 15/8/49 and in 7/53 (see Coombs & Woodroffe, 1955). Additionally, a single male was found under drift refuse (exact location unknown) on 22/7/63 (RCW). There are no other Yorkshire records but the species has recently been recorded from Northampton and Inverness & Nairn.

Atomaria berolinensis Kraatz. Examples located near the Lighthouse on 29/6/91 (RJM) constitute the first and only record for the Peninsula.

Atomaria rhenana Kraatz. Specimens from Chalk Bank on 29/6/91 (RJM) add to the known distribution. The species had previously only been encountered north of the Warren. Spurn and Fisherman's Channel are the only known stations for this species in Yorkshire; this being the species' northern limit in the British Isles (Johnson, 1993).

Atomaria rubella Heer. A single located under decaying rhubarb leaves at the side of the Annexe on 16/9/96 was the third record (MLD det. CJ). The others were from an unrecorded area on 10/6/50 and from recently cut vegetation outside Warren Cottage on 3/5/93.

Atomaria testacea Stephens = (*Atomaria ruficornis* (Marsham)). Specimens from Chalk Bank and near the Lighthouse on 29/6/91 (both RJM) constitute the first records since the initial survey and add to the known distribution. The previous records were from the Warren, the *Phragmites* marsh and the 'marsh meadow' (all in 6/50).

Ephistemus globulus (Paykull). A single found under decaying rhubarb leaves at the side of the Annexe on 16/9/96 (MLD) was the sixth record (third since the initial survey). The others were from the *Phragmites* marsh, the 'marsh meadow', the Warren and the Humber shore at the Warren.

Phalacrus fimetarius (Fabricius). Examples found at Chalk Bank and near the Lighthouse on 29/6/91 (both RJM) constitute the first records since the initial survey. During these years (1947-1953) the species was located at a number of localities along the Peninsula where it was said to be present in June and July and common in August.

Coccinella undecimpunctata Linnaeus. Previously encountered in the salt marsh at 'Wire Dump', the Point, 'Scrape Field', 'Canal Scrape' and the Warren. A single on the wall of Warren Cottage on 16/9/96 (MLD) was only the fourth record since the initial survey.

Aridius bifasciatus (Reitter). This introduced species has now been located at Chalk Bank and all areas between the Warren and the northern limit of the recording area. A record from an unknown locality at the end of 7/63 (RCW) predates the earliest published record.

Corticaria punctulata Marsham. Specimens from an unrecorded location in 5/28 (recorder unknown) constitute the first and only record for the Peninsula.

Cis fagi Waltl. There is a record on the YNU database of this species occurring at Spurn (exact location unknown) on an unrecorded date. This is a woodland species which is found in bracket fungi and is unlikely to have ever occurred at Spurn. As no voucher specimens are available for confirmation the species has not been admitted to the Spurn List.

Phylan gibbus (Fabricius). Previously encountered at the Warren, in the salt marsh at 'Wire Dump', at the 'Narrow Neck', between the 'Narrow Neck' and 'Black Hut' and the marram areas along the Humber foreshore and seashore (exact locations unknown). A single from just north of the Lighthouse on 14/4/95 (PAC) was only the third record since the initial survey.

Phaleria cadaverina (Fabricius). A single from a dead gull *Larus* spp. on the seashore (exact location unknown) on 4/5/74 (MJS det. MLD) was the fifth record. The others (also from unknown locations) were recorded in 7/48, 6/50, 8/79 and 7/89.

Crypticus quisquilius (Linnaeus). During the years of the initial survey the species was located in most areas along the Peninsula, where it was said to be abundant in June, common in July but scarce in August. Several specimens found on open ground to the north of the Lighthouse on 8/6/96 (PAC) constitute the fourth recent record. The others being from the Warren, the Humber shore at the 'Narrow Neck' and the Humber shore between the 'Narrow Neck' and 'Black Hut'.

Vincenzellus ruficollis (Panzer). The record from an unknown location in 5/28 (recorder unknown) predates the only published record of a single found under straw refuse in the 'marsh meadow' on 22/7/48.

Rhinosimus planirostris (Fabricius). A single found in a grass pile outside Warren Cottage on 19/9/96 (MLD) constitutes the first record for the Peninsula.

Notoxus monoceros Muller. Encountered abundantly along the Humber foreshore and seashore (exact locations unknown) during the summer months of the initial survey. A single which alighted on the window of a vehicle parked just to the north of the Lighthouse on 8/6/96 (PAC) was the fourth recent record, the others being from an unrecorded area on the Humber foreshore, Chalk Bank and on the sea shore near the Point.

Bruchus loti Paykull. A single swept from low herbage near the 'Canal' on 17/6/95 (PAC) was the second record for the Peninsula, the other being from the *Phragmites* marsh on 13/8/66.

Phaedon tumidulus (Germar). Seven specimens found in sand hollows at the entrance to the Point on 6/5/96 (PAC) constitutes the third record, the others being from the Point dunes on 16/4/94 and to the north of the Lighthouse on 11/3/95.

Longitarsus membranaceus (Degeer). Examples from an unknown location on an unrecorded date (EGB) constitute the first and only record for the Peninsula.

Sphaeroderma rubidum (Graells). Specimens from an unknown location in 1949 (WDH) constitutes the first and only record for the Peninsula.

Sphaeroderma testaceum (Fabricius). A single swept from low herbage along the cliff edge in 'Clubley's Field' on 13/8/94 (PAC) was the fifth record (the second modern day). The others were from the Warren on 18/7/48, along the Main Ridge on 20 and 22/7/48 and Chalk Bank on 30/7/94.

Psylliodes marcida (Illiger). Eight specimens found on *Cakile maritima* at the Point on 22/7/63 (RCW) were the first to be recorded since the years of the initial survey. During

these years the species was said to be present in June, common in July but rare in August.

Cassida rubiginosa Muller. Previously encountered in the salt marsh at 'Wire Dump', at the Warren, in 'Clubley's Field' and in the marram along the Humber shore near the Warren (exact location unknown). A single found in the Annexe on 7/6/96 (BRS det. MLD) was only the third record since the initial survey.

Rhynchites germanicus Herbst. The record from an unknown location in 5/28 (recorder unknown) predates the only published records from the Warren on 7/6/50 and 'Clubley's Field' on 19/6/90.

Exapion ulicis Forster. The only previous records were from the Warren on 1/5/93 and the Point on 14/5/94. Eight specimens were found on gorse *Ulex* spp. at the Point on 30/4/95 and a few were located in the same area on 5/5/96 (both PAC).

Protapion apricans Herbst. A single female in a grass tussock (exact location unknown) on 21/7/63 (RCW) was the sixth record (the second since the 1947-1953 survey). The others were from the 'marsh meadow', the *Phragmites* marsh, the Warren and the 'Scrape Field'.

Protapion assimile Kirby. A single swept from low herbage near the 'Canal' on 17/6/95 was the first record for the Peninsula (PAC det. MLD).

Protapion ononicola Bach. The record from an unknown location in 1898 (EGB) predates the only published records from 'Wire Dump' on 11/6/50 and 'Clubley's Field' on 18/6/90.

Barynotus obscurus (Fabricius). A single in the Point dunes on 23/7/63 (RCW) adds to the known distribution. The species had previously only been encountered on the 'Canal Zone' (19/6/47 and 31/7/94) and the Warren area (30/5/92).

Hypera dauci (Olivier). Specimens from an unrecorded location in 1919 (GBW) constitute the first and only record for the Peninsula. The species is afforded Notable B status, being thought to occur in between 31 and 100 10km squares of the National Grid.

Hypera nigricornis (Fabricius). A single on *Ononis repens* in an unrecorded area on 20/7/63 (RCW) was the fourth record (the third since the initial survey). The others were from the salt marsh at 'Wire Dump', the *Phragmites* marsh and an unrecorded location.

Tychius picirostris (Fabricius). Examples from an unrecorded location in 1946 (WDH) constitute the first and only record for the Peninsula.

Mecinus pyraster (Herbst). The record from an unknown location in 5/28 (WJF) predates the only published record from the 'marsh meadow' on 17/6/47.

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THE VEGETATION OF SPURN (1946-1996)

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Spurn fascinates. It is a finger of land between the River Humber and the North Sea, owing its existence to the activity of *Ammophila arenaria* (L.) Link (Marram) which binds the sand. Lesser roles in binding sand are performed by *Leymus arenarius* (L.) Hochst. (Lyme-grass), originally found mainly on the river-side, and by *Elytrigia juncea* (L.) Nevski (Sand Couch). *Carex arenaria* L. (Sand Sedge) plays a similar part in holding the surface sands. The hybrid *Elytrigia atherica* x *E. juncea* occurs here and there on the peninsula.

I first visited Spurn as a bird-watcher in 1946, but there was ample opportunity to observe the main vegetational features. The most conspicuous and characteristic species of Spurn are *Eryngium maritimum* L. (Sea-holly), still abundant at the narrow-neck, and *Calystegia soldanella* (L.) R. Br (Sea Bindweed) in dunes in the same area and elsewhere.

In the Point Camp was *Inula conyzae* (Griess.) Meikle (Ploughman's-spikenard) and *Diplotaxis tenuifolia* (L.) DC. (Perennial Wall-rocket), both in quantity. *Hippophae rhamnoides* L. (Sea-buckthorn) dominated the ridge down the east side of the peninsula and the alien *Claytonia perfoliata* (Donn) ex Willd. (Springbeauty) was widely distributed and abundant as now. *Onosis* sp. (Restharrow) in quantity by the roadside and along the railway added colour to the scene. *Daucus carota* L. (Wild Carrot) too was also widely distributed.

On the river-side of the lifeboat cottages, south of the lighthouse, could be found maritime species including *Seriphidium maritimum* (L.) Polj. (Sea Wormwood), *Aster tripolium* L. (Sea Aster), *Catapodium marinum* (L.) C. E. Hubb. (Sea Fern-grass), *Plantago maritima* L. (Sea Plantain) and the alien *Lobularia maritima* (L.) Des. (Sweet Alison). This area is now a car park.

The inlet near the chalk bank and the adjacent salt-marsh was dominated by *Atriplex portulacoides* L. (Sea-purslane). Other salt-marsh species present in the chalk bank area were *Glaux maritima* L. (Sea-milkwort), *Limonium vulgare* Miller (Common Sea-lavender), Sea Plantain and *Suaeda maritima* (L.) Dumort. (Common Annual Sea-blite).

Tom Dargie of Hull University found *Parapholis incurva* (L.) C. E. Hubb. (Curved Hard-grass) in 1970 in a depression near the Chalk Bank, a special area which is occasionally inundated with salt-water. Sea Fern-grass was also present and *Sagina maritima* G. Don (Sea Pearlwort) occurred in great quantity. Today the area seems to be drying out and the habitat threatened, Curved Hard-grass and Sea Fern-grass were seen in the locality in 1996, but not Sea Pearlwort.

In 1946, Spurn Bay was an extensive area of mud at low tide, with just an occasional emergent shoot of *Spartina anglica* C. E. Hubb. (Common Cord-grass). Islands of Common Cord-grass soon appeared and by 1958 had linked up to form a continuous belt which significantly slowed up the tidal ebb and flow. By 1978 a substantial salt-marsh had built up. Large areas were dominated by *Puccinellia maritima* (Hudson) Parl. (Common Saltmarsh-grass) and Sea Aster which had replaced much of the Cord-grass. At the top of the salt-marsh a belt of Annual Sea-blite and *Salicornia europaea* L. (Glasswort) occurred

by this time. Gradually other species came in at the top of the saltmarsh: *Cochlearia officinalis* L. (Common Scurvygrass), *C. anglica* L. (English Scurvygrass), *Juncus gerardii* Lois. (Saltmarsh Rush), *Parapholis strigosa* (Dumort.) C. E. Hubb. (Hard-grass), Sea Plantain, *Spergularia media* (L.) C. Presl (Greater Sea-spurrey), *S. marina* (L.) Griseb. (Lesser Sea-spurrey) and *Triglochin maritimum* L. (Sea Arrowgrass). Succession has proceeded and recent photographs by John Cudworth show zones dominated by Sea-purslane and Scurvygrass which have replaced the belts of Common Saltmarsh-grass and Sea Aster.

Zostera angustifolia (Hornem.) Reichb. (Narrow-leaved Eelgrass) was recorded *c.* 55m from the shore of the narrow neck (Pashby, 1977) while *Z. noltii* Hornem. (Dwarf Eelgrass) occurred extensively above mid-tidal level on the Humber shore (Pashby, 1977). *Salicornia europaea* L. (Common Glasswort) is common on the upper levels of the saltmarshes at Spurn, with *S. dolichostachya* Moss (Long-spiked Glasswort) occurring throughout the saltmarsh from upper to lower levels while *S. fragilis* P. Ball and Tutin (Yellow Glasswort) occurs in the lower part of the saltmarsh (Fenton, 1977).

Originally the only species on the river shore for most of its length was *Honckenya peploides* (L.) Ehrh. (Sea Sandwort), with *Salsola kali* L. (Prickly Saltwort) occurring towards the south. By the time a saltmarsh had developed other species had invaded the river shore, including *Atriplex prostrata* Boucher ex DC. (Spear-leaved Orache), *A. glabriuscula* Edmondston (Babington's Orache) and, rarely, *Atriplex laciniata* L. (Frosted Orache).

In the 1950s there were extensive fixed dunes in the Warren supporting several calcicoles. *Brachypodium pinnatum* (L.) P. Beauv. (Tor-grass) was dominant along the banks of the railway, then still in use, with *Blackstonia perfoliata* (L.) Hudson (Yellow-wort) frequent there. *Vicia tetrasperma* (L.) Schreber (Smooth Tare) was frequent on the bank by the Warren Cottage. Several spikes of *Orchis mascula* (L.) L. (Early-purple Orchid) occurred in most years. One spike of *Ophrys apifera* Hudson (Bee Orchid) occurred here in 1950 and two spikes of *Orchis morio* L. (Green-winged Orchid) in 1964.

South of the Warren was an area with *Angelica sylvestris* L. (Wild Angelica), *Thalictrum flavum* L. (Meadow Rue) and *Valeriana officinalis* L. (Common Valerian) occurring in some quantity.

The area of the dunes to the south of the Warren has long had some interesting aliens. A continental form of *Cirsium arvense* (L.) Scop., var. *incanum* (Field Thistle) persisted here for many years but has now been lost. *Euphorbia* x *pseudovirgata* (Schur) Soó) has long been known here.

Two notable British species have occurred in this same area. In 1974, Ann Fritchley discovered a fine spike of the beautiful *Orchis simia* Lam. (Monkey Orchid), its first British occurrence north of the River Thames valley and one of only four British colonies known at the time (Crackles, 1975a). The plant was artificially pollinated by me in 1975 and other plants subsequently using a stem of *Elytrigia atherica* (Link) Korguélen ex Carreras Martinez (Sea Couch). Twenty-five plants occurred in 1981 including nine flowering plants, 14 plants having flowered at some time. The area was inundated with salt-water in the winter of 1982; no flowering spikes were produced in that year and no plants have been seen since. In 1978 two patches of *Polypodium interjectum* Shivas (Intermediate Polypody) were found at the edge of the dunes in the area. These plants were later lost by the construction of a new section of road but more plants turned up in the dunes to the east of the new road. This species had not previously been recorded in the East Riding of Yorkshire.

There was an extensive bed of *Phragmites australis* (Cav.) Trin. ex Steudel (Common Reed) to the east of Warren Cottage. In the drier parts of this area were *Carex flacca* Schreber (Glaucous Sedge), *Carex otrubae* Podp. (False Fox-sedge), *Cynosurus cristatus* L. (Crested Dog's-tail), *Leucanthemum vulgare* Lam. (Ox-eye Daisy), *Lotus corniculatus* L. (Common Bird's-foot-trefoil) and *Picris echioides* L. (Bristly Ox-tongue). *Potentilla anserina* L. (Silverweed) dorninated part of the area.

Just north of Warren Cottage was a brackish pond with *Ranunculus baudotii* Godron (Brackish Water-crowfoot) and *Ruppia maritima* L. (Beaked Tassel-weed). There was a freshwater pond with a fine colony of *Alisma plantago-aquatica* L. (Water Plantain). *Apium nodiflorum* (L.) Lagasca (Fool's Water-cress) was also present.

The fields to the north of the warren had a clay soil and in grassy fields such plants as *Silaum silaus* (L.) Schinz & Thell. (Pepper Saxifrage) and *Hordeum secalinum* Schreber (Meadow Barley) occurred, with Smooth Tare on drain banks.

Arable weeds recorded in Redvers Clubley's cornfield were *Anchusa arvensis* (L.) M. Bieb. (Bugloss), *Anthemis cotula* L. (Stinking Chamomile), *Chenopodium album* L. (Fat-hen), *Coronopus squamatus* (Forsskål) Asch. (Swine-cress), *Euphorbia helioscopia* L. (Sun Spurge), *E. exigua* L. (Dwarf Spurge), *Fallopia convolvulus* (L.) A. Löve (Black-bindweed), *Fumaria officinalis* L. (Common Fumitory), *Geranium dissectum* L. (Cut-leaved Crane's-bill), *Gnaphalium uliginosum* L. (Marsh Cudweed), *Matricaria recutita* L. (Scented Mayweed), *Odontites vernus* (Bellardi) Dumort. (Red Bartsia), *Persicaria maculosa* Gray (Redshank), *P. lapathifolia* (L.) Gray (Pale Persicaria), *Ranunculus sardous* Crantz (Hairy Buttercup), *Raphanus raphanistrum* L. (Wild Radish), *Sinapis arvensis* L. (Charlock), *Silene noctiflora* L. (Night-flowering Catchfly), *Spergula arvenis* L. (Corn Spurrey), *Torilis nodosa* (L.) Gaertn. (Knotted Hedge-parsley), *Urtica urens* L. (Small Nettle), *Veronica chamaedrys* L. (Germander Speedwell), *V. persica* Poiret (Common Field-speedwell) and *Viola arvensis* Murray (Field Pansy).

In June 1954 I spent a week at Spurn surveying the area for the Nature Conservancy Council, as a result of which Spurn was declared a Site of Special Scientific Interest. I spent most of the time examining the short turf which was a most important habitat, occupying some four-fifths of the peninsula. I examined large areas [1] on both sides of the road in the warren, [2] in front of and behind the warden's house, [3] both south and north of the chalk bank area, [4] near the lighthouse and [5] by the railway. The short turf on the parade ground on the Point Camp was not examined at this time. In 1946, *Trifolium suffocatum* L. (Suffocated Clover) and *T. micranthum* Viv. (Slender Clover) were found in the Warren by Dr Sledge and Professor Good on the occasion of a Y.N.U. meeting.

The following is a selected list of species found in short turf in 1954. The figure following each species gives the number of areas in which each species was found; ab = abundant, c = common, fr = frequent, occ = occasional, r = rare, l = locally. *Aira praecox* L. (Early Hair-grass) fr (4); *Aphanes arvensis* L. (Parsley-piert) occ to fr (4); *Arenaria serpyllifolia* L. (Thyme-leaved Sandwort) occ to c (7); *Carex caryophyllea* Latour. (Spring-sedge) occ (2); *Cerastium diffusum* Pers. (Sea Mouse-ear) occ to fr (5); *C. semidecandrurn* L. (Little Mouse-ear) occ to c (4); *C. glomeratum* Thuill. (Sticky Mouse-ear) occ to fr (4); *Erodium cicutarium* (L.) L'Hér (Common Stork's-bill) occ to c (7); *Erophila praecox* (L.) DC. (Whitlowgrass) fr (5); *Galium verum* L. (Lady's Bedstraw) occ to ab (5); *Geranium molle* L. (Dove's-foot Crane's-bill) occ to l fr (3); *Myosotis ramosissima* Rochel (Early Forget-me-not) occ to c (7); *Plantago coronopus* L. (Buck's-horn Plantain) occ to c (7); *Sherardia arvensis* L. (Field Madder) r to fr (4); *Trifolium dubium* Srbth. (Lesser Trefoil) fr to c (5), *T. striatum* L. (Knotted Clover) fr to c (4), *Valerianella locusta* (L.) Laterr. (Common Cornsalad) occ (2) and *Vicia lathyroides* L. (Spring Vetch) r to fr (3).

With the advent of myxomatosis in 1954 and consequent absence or severe reduction of rabbit grazing since that time, the vegetation of the peninsula has moved towards a climax, with Sea Buckthorn predominating. Short turf areas have decreased drastically in extent and have at times been maintained by treading and not by grazing. Inevitably species characteristic of short turf have decreased greatly in frequency and some could be on the verge of extinction.

I did not find Rough Clover (*Trifolium scabrum* L.) in the 1950s. Less widely distributed than Knotted Clover but very variable in quantity, it carpeted an area by the eastern side of the road near the Warren Cottage in 1987. The scarce British plant Suffocated Clover, found in some quantity on the parade ground in the point camp in 1970, is still there; it has

turned up in the Warren from time to time, particularly when there has been soil disturbance.

In recent years sheep have been introduced onto the chalk bank area in the hope of retrieving short turf plant associations. Some short turf species have indeed recovered there, including Spring Vetch, Sea Mouse-ear and Early Forget-me-not. The sheep are wintered in the warren, where an electric fence has been erected; as a result, vegetation within the fence grows long in the summer. Most short turf species occur at the edge of such vegetation abutting concrete bases of former buildings.

Sea Mouse-ear occurs in quantity at the side of paths through the dunes in an area just to the north of the lighthouse. Spring-sedge has not been reported in recent years. At the present time, the best area of short turf is in the parade ground in the Point Camp.

An important plant of disturbed sand is *Phleum arenarium* L. (Sand Cat's-tail) in its only East Riding locality. It has often been difficult to find this species over the years and it has usually been in small quantity. At present it is plentiful under a bank of Sea Bindweed and in the general area of the car park just north of the lighthouse. Other species of disturbed sand occurring at Spurn are *Aira caryophyllea* L. (Silver Hair-grass), *Arenaria serpyllifolia* subsp. *leptoclados* (Reichb.) Nyman (Slender Sandwort) and *Catapodium rigidum* (L.) C. E. Hubb. (Fern-grass). *Cakile maritima* Scop. (Sea Rocket) is a characteristic plant of disturbed sand occurring in different quantity and position each year.

After the severe flooding of 1953, a low defence bank was created, taking material from the adjacent land to produce a virgin bank and canal known as Kilnsea Canal. A fascinating process of colonisation followed. Plants found on the bank included *Trifolium fragiferum* L. (Strawberry Clover) and *Lotus glaber* Miller (Narrow-leaved Bird's-foot Trefoil). Both are still to be found. In the following year most common saltmarsh species occurred along the canal. *Carex extensa* Gooden. (Long-bracted Sedge), only previously known in the Kilnsea Beacon area in small quantity appeared in great quantity, as did *Juncus maritmus* Lam. (Sea Rush), previously recorded in only one locality in the East Riding i.e. just south of Bridlington, in the last century.

Another locally uncommon species occurring by the canal is *Carex distans* L. (Distant Sedge). Long-bracted Sedge and Sea Rush are to be found at the head of the canal, as well as a number of salt-marsh species including Sea-milkwort, Hard-grass, Sea Plantain, Lesser Sea-spurrey, Greater Sea-spurrey and Sea Arrowgrass. On the drier part of the canal head are False Fox-sedge, *Centaurium erythraea* Rafn (Common Centaury), Bristly Oxtongue and *Senecio erucifolius* L. (Hoary Ragwort). Strawberry Clover occurs in the damper places. A single plant of Bee Orchid occurred in the area in 1996.

Aliens have been a feature of Spurn over the years. Those species occurring most frequently and in the greatest quantity are Springbeauty, *Lepidium draba* L. (Hoary Cress), *Sisymbrium altissimum* L (Tall Rocket) and *S. orientale* L. (Eastern Rocket). There have recently been reports of an *Amsinckia* in a bird trap in the Point Camp. I believe this to be *Amsinckia micrantha* Suksd. which is widespread in the East Riding. Uncommon aliens recorded included *Solanum sarachoides* Sendtner (Green Nightshade) and *Melilotus indicus* (L.) All. (Small Melilot).

The peninsula has been subject to significant flooding from time to time. In 1978, there was severe flooding with river water flooding through at the Chalk Bank. In the following summer a single fine plant of *Glaucium flavum* Crantz (Yellow Horned-poppy) occurred on the west side of the road to the north. In addition, two patches of *Silene uniflora* Roth (Sea Campion) appeared at the edges of the dunes on the river side, the first time either species had been recorded for the Yorkshire coast since the 18th century.

The winter's flooding also upset the distribution of many species. Thus species usually found on the shore became permanently established on the peninsula. Prickly Saltwort, formerly only found on the Humber shore, turned up in quantity on both sides of the road near where the Yellow Horned-poppy occurred. Eventually there were three Yellow Horned-poppy plants; all were eventually lost, but another turned up on the opposite side of the road. By this time there had been much loss of land, particularly in the warren and to

the south of it, most notably in 1978 at the back of Warren Cottage. The warden's garden was under salt water for some time. A number of species were introduced with imported soil, including *Hyoscyamus niger* L. (Henbane), Sun Spurge, *Euphorbia peplus* L. (Petty Spurge), *Lamium amplexicaule* L. (Henbit Dead-nettle), *L. hybridum* Villars (Cut-leaved Dead-nettle) and Small Nettle.

As a result of repeated flooding, brackish water habitats increased north of Warren Cottage. Frequent pools on the coastal strip contained Beaked Tasselweed and *Juncus ambiguus* Guss was found on adjacent marshy ground in 1986.

The vegetation has changed greatly in the course of time (Crackles, 1975, 1986). Of the 304 species listed between 1946 and 1975 a number have inevitably been lost because of habitat loss. However, 55 species have been recorded since 1975. In some cases this is due to improved knowledge. Some of the additional species have been mentioned in the text. Other species of interest are *Barbarea stricta* Andrz. (Small-flowered Winter-cress) and *Coronopus didymus* (L.) Smith (Lesser Swine Cress). In 1978 a bank of clay was imported from the Easington gas terminal. Interestingly, a plant of *Hypericum* x *desetangsii* Lamotte (Des Etangs' St John's-wort) occurred on the bank but soon disappeared. An examination of the Rest Harrows showed that the hybrid *Ononis spinosa* x *O. repens* occurred as well as *O. repens* L. but no *O. spinsoa* L. was found.

More recently, Peter Cook has found *Stellaria pallida* (Dumort.) Piré (Lesser Chickweed) on the dunes and the rare coastal form of Common Couch (*Elytrigia repens* (L.) Desv. ex Nevski subsp. *arenosa* (Spenner) A. Löve). More species will no doubt follow.

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THE CURRENT STATUS OF THE WATER VOLE *ARVICOLA TERRESTRIS* IN THE PEAK DISTRICT

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The Water Vole is currently declining rapidly from its former status as a common and well distributed species. It has disappeared from many of its former sites, and sufficiently seriously and rapidly to have recently been given legal protection by its addition to Schedule 5 of the Wildlife & Countryside Act 1981. This prevents its deliberate killing, disturbance or sale, dead or alive, but there is little evidence that direct human persecution is a real problem. Either loss of habitat or predation by the American Mink *Mustela vison* are regarded as the main cause of its decline (Strachan & Jefferies, 1993).

In the Peak District, it was such a familiar sight on the limestone rivers, in particular, that it was seriously under-recorded. For instance, during surveys of the Rivers Dove and Manifold during 1977-79 for Common Sandpipers *Actitis hypoleucos* (Holland *et al.*,

1982), signs of Water Vole were regularly seen but rarely recorded, though sightings of the animals themselves always were recorded.

During 1990, Water Voles were recorded on 10 occasions along the inflow stream at Combs Reservoir (SK0379), which became my local site that year following a move of house from Manchester. The following year, however, there were only two sightings, and none since. During surveys of the Rivers Ashop and Alport for colour-ringed Common Sandpipers, conducted weekly from late April to mid-July each year (Holland & Yalden 1991, 1994), sightings were never numerous, but were never-the-less regularly made each year up to 1993; in 1994 none was seen (nor since). These local declines prompted a deliberate survey of a number of sites during 1994, mostly in August and September. This note presents the results; the species has indeed declined locally.

Methods

Records from 1969 to 1993 were only accumulated accidentally and sporadically. Signs, in particular, were then often not recorded. Never-the-less, past sites were prime targets for re-examination. In 1994, sections of likely waterway were checked for signs: burrows and feeding 'lawns', footprints in mud, characteristic latrines, and signs of chewed *Juncus* and other plants. Signs are both distinctive for the species and a reliable method for survey (Strachan & Jefferies, 1993). Surveying during late summer meant that exposed mud was available for checking for footprints, and latrines were unlikely to have been erased by floodwaters. Direct sightings, or the characteristic 'plop' of a diving Water Vole, were a bonus. A few records, past and present, came from analysis of pellets of predators, particularly Tawny Owls *Strix aluco*.

Results

The records accumulated from 1969-1992 (Fig. 1) provide a scatter of spots across the Peak District, 33 sightings, only 7 sign-only records, and 4 records of skulls in predator pellets. About half (21 of 44 records) come from the rivers of the White Peak (Dove, Wye, Bradbourne Brook). The cluster of records in the central Dark Peak indicates the Common Sandpiper study area.

The survey of 1994 covered approximately 41.75km of river and canal bank in 34 stretches. Only 10 stretches, about 8.3km in total length, were positive. Signs of Water Vole were found at 11 sites, only 2 Water Voles were seen, and one skull was found in a Tawny Owl pellet (Fig. 2). At 39 sites, no signs were recorded, despite that rivers were mostly surveyed wearing waders. Many of these negative records came from places where Water Voles had been seen, opportunistically, on previous occasions, implying that they had been suitable habitat, and perhaps are still.

Discussion

The most critical recent factor causing a decline of Water Voles is certainly predation by Mink. Water Voles being tracked with radio-collars have been taken by Mink before the researcher's eyes (Woodroffe *et al.,* 1990). Their very recent declines in the Thames basin and more locally in the River Amber catchment, just east of the Peak District, have coincided very precisely with the spread of the Mink through those ranges (Strachan *et al.,* 1997). However, it is not very obvious that this is a major factor within the Peak District. Neither sightings nor signs of Mink were evident during this survey, except for one scat at one marginal site, and in the Dark Peak there are sufficient gamekeepers to be certain that no Mink are established. They have been present on the River Dane at least since 1984, but again the evidence for this is primarily in the form of corpses displayed by the water bailiff.

An equally serious but less evident factor affecting the Water Vole is the heavy grazing of bankside vegetation. This too has become more severe in recent years, but because it is a less obvious change than the arrival of a new predator, it is easily overlooked. Sheep numbers trebled in the Dark Peak between the 1930 agricultural census and 1976 (Yalden, 1981), and they have increased further since then, from 78,000 to 118,000 in 1993

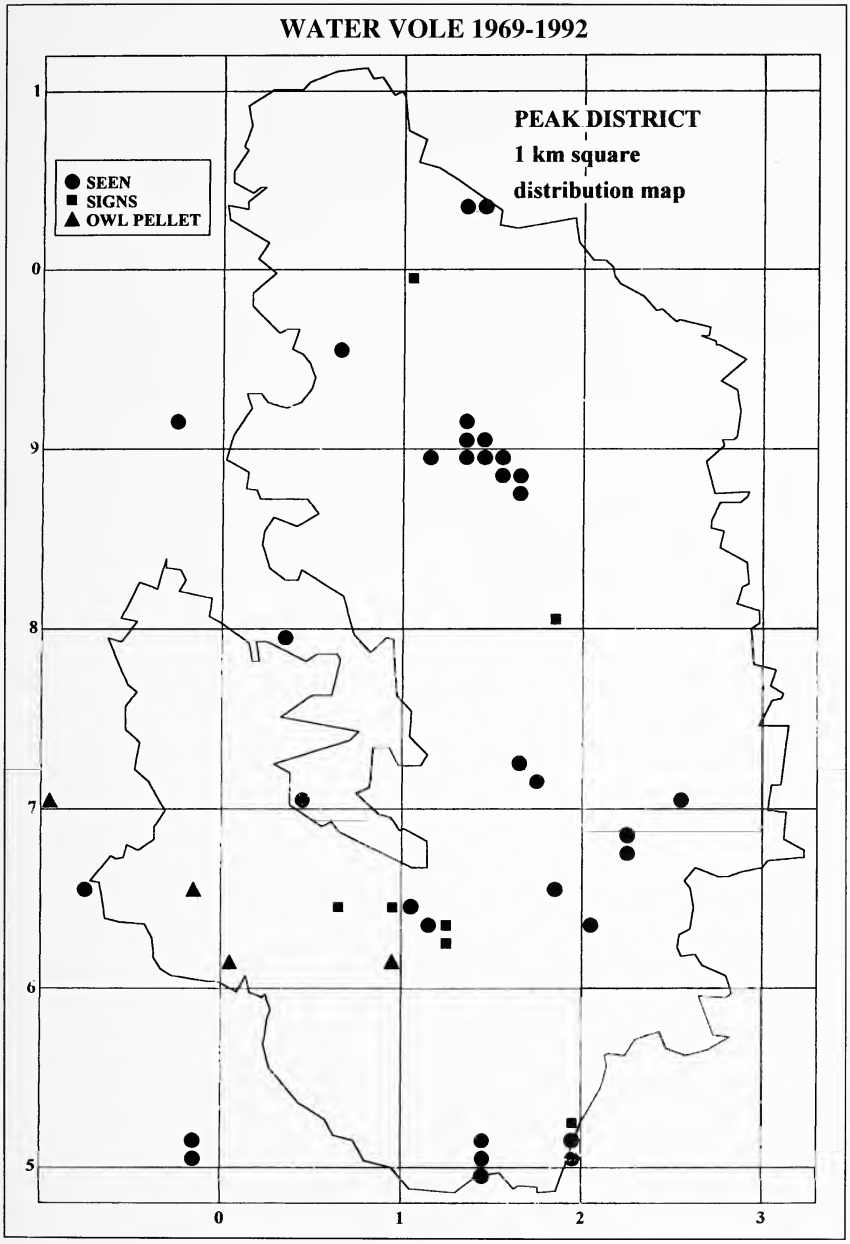

FIGURE 1
Recorded distribution of Water Voles *Arvicola terrestris* in and around the Peak District National Park (whose boundary is indicated by the solid line) during 1969-1992.

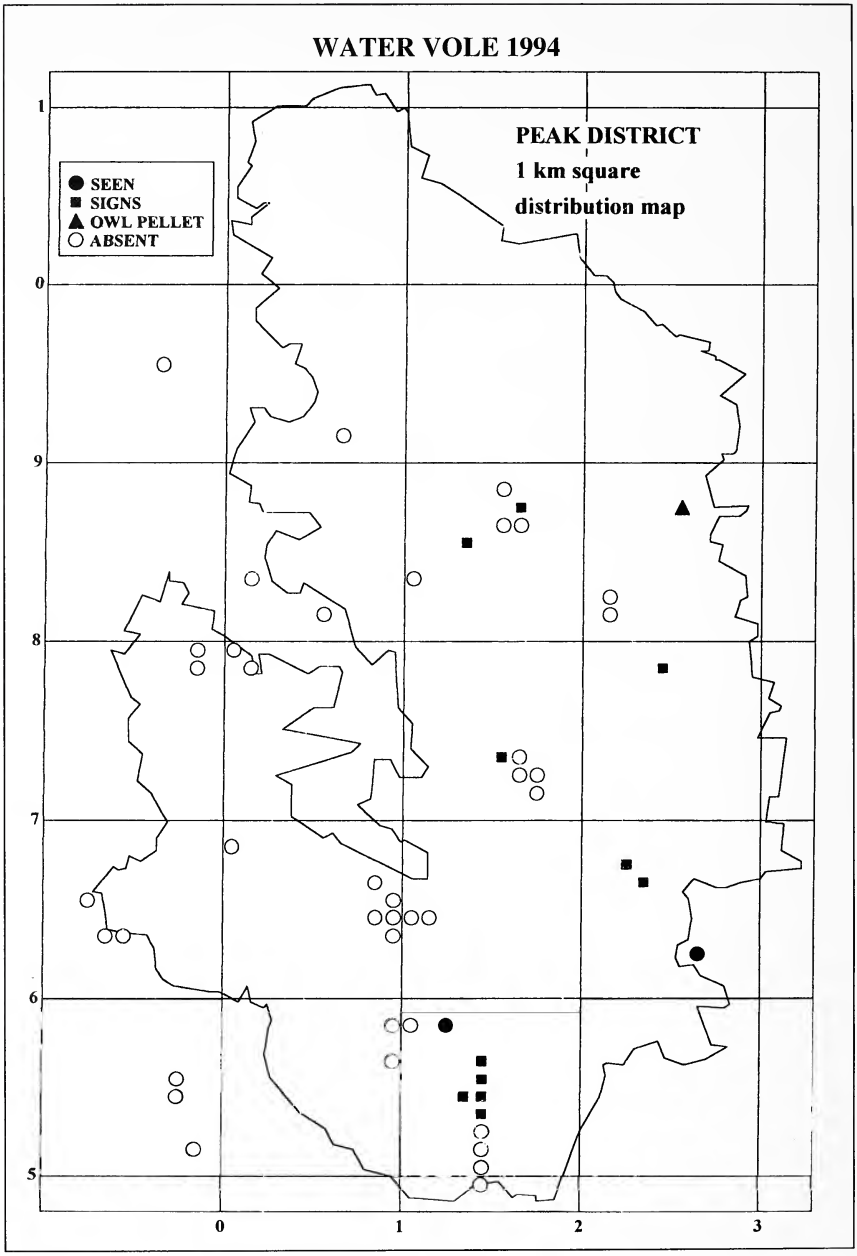

FIGURE 2
Recorded distribution of Water Voles *Arvicola terrestris* in and around the Peak District National Park (whose boundary is indicated by the solid line) during 1994.

(Anderson *et al.,* 1997). Both beef and dairy cattle are also more numerous, the latter primarily in the White Peak. Two sites in particular suggest that this is the major factor that has militated against the species locally. At the western end of the Common Sandpiper study area, a large area of *Juncus* beside the River Ashop at Upperhouse Farm (SK1189) was a regular site for signs of Water Voles. A change of tenancy and a greater emphasis on grazing beef cattle in that field since 1990 has resulted in the deliberate elimination of most of the *Juncus* by manuring and enforced grazing. Water Vole signs have not been recorded there since 1989. In Dovedale, south of Milldale, the appearance of signs of Water Vole as one surveys southwards coincides with the National Trust fence against cattle to the north. The banks further south have a good fringe of marginal plants, including *Iris*. The two sites where Water Voles were seen in 1994 (Beresford Dale, Darley Dale) are also sites where one bank, at least, is ungrazed. Stachan *et al.* (1997) have argued that it is not Mink predation by itself that has caused the catastrophic decline of the Water Vole in Britain, but the combination of that additional predation with the extremely narrow habitat fringe that is all that remains to the Water Vole in intensively farmed landscapes. This precisely matches the current situation in the Peak District. It also matches the historical evidence of a long-term decline in the abundance of the Water Vole which has continued for 2,000 years or more. Both nationally and locally, Water Voles were extremely abundant in archaeological sites of Mesolithic to Bronze Age times; 54.7% of the small mammal fauna at Neolithic Dowel Cave, 81.1% at Bronze Age Wigber Low, 34.6% at Bronze Age Fox Hole, 40% at Iron Age Dowel Cave (Maltby 1983, Yalden 1992). In Roman times, it seems to have declined to around 5% of the fauna (Ossom's Eyrie Cave in the Manifold Valley; Bramwell *et al.,* 1990). This matches the spread of agriculture to these upland areas, as does its further decline.

To add to the species' difficulties, the aquatic plants on which, in part, it feeds are susceptible to water pollution; there are at least two Peak District sites, not readily explained by changes in grazing pressure, where this seems to be the cause of decline or absence. The River Wye downstream from Buxton has been subject to several well-documented cases of acute pollution (in one, all fish were killed, and restocking has only replaced the Brown Trout *Salmo trutta*, not the Grayling *Thymallus thymallus* or Crayfish *Austropotamobius fluviatilis*). It also suffers from chronic pollution, from Buxton sewage works and from run-off from the adjacent A.6 trunk road. The aquatic vegetation has largely disappeared along a 15km stretch, where Water Voles used to be very abundant but are now restricted to a small area above Litton Mill. The River Goyt downstream from the sewage works at Whaley Bridge is another site that has good bankside vegetation, but the river itself is so heavily polluted that it was anoxic when surveyed in August 1994.

The conservation of this species is assuming a higher priority. Locally, emphasis on establishing good areas of marshy vegetation in oxbows, at stream confluences and at inlets into reservoirs would probably do most to favour this species. Good bankside vegetation in such sites could also double as a haven for returning Otters, another species that should be part of local biodiversity initiatives (cf. Strachan & Jefferies, 1996). Pollution should be increasingly restricted as better management of sewage and other facilities takes effect.

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THE WHITE-FACED DRAGONFLY *LEUCORRHINIA DUBIA* (VANDER L.) ON THORNE MOORS

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The Dale Archives at the Hope Library, Oxford University Museum (*vide* Smith 1986), show that the noted entomologist J. C. Dale visited the Doncaster area in 1837, from 24-31 July and on 11 August. Dale visited Melton Wood, Hatfield Moors and Thorne Moors, working the latter locality on 28 July and 11 August. Other names associated with this entomological collecting trip are Wm Beckitt, John Curtis, C. W. Dale, E. R. Dale, Benjamin Standish, Richard Weaver, Dr P. White, R. Wood and the Rev. F. O. Morris. The latter, a lifelong friend of J. C. Dale and then assistant curate of Armthorpe and Christ Church, Doncaster, probably encouraged, and perhaps organised, the visits to the three areas. He was resident in Doncaster 1835-37, and became a member of the Doncaster Lyceum, whose honorary members, presumably as a result of Rev. Morris's influence, included J. C. Dale and John Curtis (Anon., 1837). Rev. Morris's youngest son referred to his father's 'favoured spots' in the Doncaster district, including Thorne Moors, where 'he took many rare specimens of butterflies and moths, which he added to his already extensive and well-ordered collections' (Morris, 1897).

It is inconceivable that the excursionists were introduced to entomologically unknown sites. The earliest precise insect records from Thorne Moors emanate from the 1820s, and involve two species: the Downy Emerald *Cordulia aenea* (L.) (Odonata: Corduliidae), captured by Wm Beckitt in 1823, and the Large Heath *Coenonympha tullia* Müll. (Lepidoptera: Satyridae), known to James Backhouse (1794-1869), as recorded by Stephens (1828). Beckitt, also a member of the Doncaster Lyceum (Anon., 1837), forms a known link between those pioneer days of the 1820s and the events of 1837, and was perhaps

persuaded by Morris to act as guide at Thorne in the latter year.

On the two dates in 1837, specimens from many orders were collected on Thorne Moors, including Odonata. The latter comprised members of three families: the Coenagrionidae (Common Blue Damselfly *Enallagma cyathigerum* (Charp.)), Aeshnidae (Common Hawker *Aeshna juncea* (L.), Emperor Dragonfly *Anax imperator* Leach) and Libellulidae (Black Darter *Sympetrum danae* (Sulz.), White-faced Dragonfly) (Limbert, 1985a). According to J. C. Dale's entomological diary and C. W. Dale's catalogue of the Dale Collection, the White-faced Dragonfly was taken on the visit of 28 July (Limbert, 1985a), though details of the collection, as given by Lucas (1908), note:

> A female (72) bears the date Aug. 11, 1837 on a yellow label with J. C. [Dale]'s figures, whilst another female (73) has a yellow label of the same sheet as the last, but not filled in. The last insect has Yorkshire (at side), which no doubt refers to the previous insect also.

It seems, therefore, that single females were retained on both dates. J. C. Dale visited Thorne Moors again in 1841, but on that occasion is not known to have collected Odonata. However, in the same year he published a note (Dale, 1841), in which he stated:

> In July, 1837, this insect occurred in plenty at Thorne Moor, Yorkshire.

John Curtis, another of the 1837 group, illustrated and described the dragonfly, and was perhaps the author of the vernacular name he employed, the '*White-faced Dragon fly*'. This was in his 16-volumed work *British Entomology*, produced between 1823-40: 'not a systematic work, but a random series of beautiful engravings, each devoted to a single species of insect . . .' (Gambles 1976). Odonata feature in three of the complement of plates and accompanying letterpress, the White-faced Dragonfly being included in volume XV (Curtis, 1838):

> This fine insect was discovered last year, about deep pools of water on Thorne moor near Dorchester by Mr. Beckett [*sic*]; Mr. Dale found it there in abundance the middle of July, but it was less common in August; Mr. Harrison also took it near Glandford Brigg, Lincolnshire. For a fine series I am indebted to the Rev. F. O. Morris and T. C. Heysham, Esq., who took them in the North of England.

In the same volume, under 'Errata and Addenda', Curtis noted '*for* Dorchester *read* Doncaster'. However, the error was nevertheless perpetuated throughout the remainder of the century. De Selys Longchamps (1846), in his revision of the British Odonata, described the species thus:

> England. Rare and local. – Mus[eum]. Curt[is]., [J. F.] Steph[ens]. Dorchester, Mus[eum]. Dale.

A common name, 'Dorchester Nymph', became enshrined in print (Gabb, 1988, Limbert 1990), the term 'Nymph' being applied to the genera *Sympetrum* and *Leucorrhinia*. It was Curtis, and not Dale or de Selys Longchamps, who originated the error (*contra* Limbert 1990). C. W. Dale referred to it as 'a mistake of Curtis' (Fraser, 1940), and this is confirmed by Curtis's entomological diary. Although providing no details about the White-faced Dragonfly at Thorne, he referred to both the Common Blue Damselfly and the Black Darter as recorded from 'Thorne moor nr. Dorchester'. The error remained 'in the works of several authors' (Bath, 1893), in particular the annotated British list by McLachlan (1884), which perhaps partly accounts for a lack of further records from Thorne for over half a century. The locality was investigated, and publicly corrected once again, by Bath (1893). He was then quoted by Lucas (1900) in the latter's standard work *British Dragonflies (Odonata)*, and the Dorset ghost was finally laid to rest until resurrected by Gabb (1988).

In the 1880s-90s the Huddersfield entomologist G. T. Porritt travelled to Thorne on a number of occasions (Skidmore *et al.* 1987). Although primarily a lepidopterist, he also worked some smaller orders, taking a specimen of the White-faced Dragonfly on 26 May 1890 (Porritt, 1897, 1907; Lucas, 1900). This last example still survives in his collection at the Tolson Memorial Museum, Huddersfield. However, the dragonfly was essentially one of those Thorne species, like the Short-winged Cone-head *Conocephalus dorsalis* (Latr.)

(Orthoptera: Tettigoniidae) and the Scarce Footman *Eilema complana* L. (Lepidoptera: Arctiidae), which was encountered by early entomologists, but which, at best, hardly survived long enough to be recorded by the first entomologists associated with the Yorkshire Naturalists' Union. On Thorne Moors, the moss litter industry commenced in 1884, and greatly expanded in the following decade. This had a major impact on wetland habitats, by extensive peat winning and concomitant drainage and reclamation (Limbert, 1987, 1990a). The White-faced Dragonfly had survived earlier attempts at drainage, especially in the 1860s (Limbert, 1990a), but the combination of drainage and widespread peat removal was clearly too damaging. Woodruffe-Peacock (1920-21), having described the former rippling surface of the undrained or long-neglected moor when impacted, added:

> Now that it has been so much more perfectly drained, I have not experienced this liquidity in the upper layers of this hag in any visit since 1891.

The coincidence of this date with Porritt's record of the White-faced Dragonfly *may* be no accident: the species was never seen again, despite frequent visits by entomologists, some of them interested in Odonata. The checking of numerous *Sympetrum*-looking specimens by the writer during the period 1976-85 revealed the Black Darter in its accustomed abundance, with no sign of its rarer congener. The former is a similarly small, dark libellulid, but lacks the white frons and dark basal wing-patches.

The White-faced Dragonfly, like *Bembidion humerale* Sturm (Coleoptera: Carabidae), *Curimopsis nigrita* (Palm) (Coleoptera: Byrrhidae) (Crossley and Norris, 1975, 1976; Buckland and Johnson, 1983, Johnson, 1978), and *Eutaenionotum guttipennis* Stenh. (Diptera Ephydridae) (Skidmore, 1996), was added to the British insect fauna from Thorne Moors. It is not clear if its discoverer in 1837, Beckitt, took it before or on 28 July, and there is nothing to suggest that one of Dale's specimens was actually collected by Beckitt (*contra* Merritt *et al.*,1996). Curtis's wording is not explicit, but seems to imply that the dragonfly was met with before 28 July, and therefore before J. C. Dale's first visit. It is obviously significant that it was Beckitt who was credited with the discovery, and not Dale. Perhaps the new species was at least a major reason for choosing the Thorne venue at all. It is interesting that Beckitt, although collecting Odonata on Thorne Moors as early as 1823, apparently did not come upon the White-faced Dragonfly until 1837. However, as a hitherto unrecognised British insect, he may have long overlooked it amongst the Black Darters, despite their partially dissimilar flight periods. Alternatively, he may have been puzzled by it. There is no evidence to confirm that Beckitt himself actually identified the new dragonfly.

The 1837 season may, fortuitously, have been a particularly good one for the White-faced Dragonfly. Two other British records have been claimed from 1837, creating an interesting temporal cluster. Neither has been researched by the writer, nor seriously overrides Curtis's assertion on priority of discovery. These are the record from Brigg, probably the source of all later references to Lincolnshire, and a specimen of the genus from Epping, Essex, by Henry Doubleday (Fraser, 1940), the locality possibly being Coopersale Common (Doubleday, 1871). Nor is it certain from where T. C. Heysham obtained his specimens, beyond 'the North of England'. Thorne Moors is the obvious locality. Curtis had a 'fine series' from Heysham and Morris; these are not in his extant collection (Dr K Walker *in litt.*). It is probably unlikely that any others collected by Morris have survived (M. Limbert unpublished).

As noted, Beckitt collected the Downy Emerald on Thorne Moors in 1823; a specimen in the Dale Collection is the sole proof of this. It may have been presented by Beckitt, as a local rarity (even then), to J. C. Dale during the latter's time in Doncaster. The first record of this species in Britain appears to be that of Edward Donovan, who took it at Hampstead, London, in 1805 (Longfield, 1949). The Thorne Moors record is therefore significantly early, and Beckitt is clearly of some interest in the history of British odonatology. Although locally resident, and Mayor of Doncaster in 1839, he has proved biographically elusive, and would repay further research.

The known genetic material available from the extinct population of the White-faced

Dragonfly at Thorne is restricted to the three specimens pinned in cabinet drawers at Oxford and Huddersfield. However, they are the proof that the species did occur naturally on the moorland in the 19th century. It is interesting to note that there are no records from nearby Hatfield Moors. This might be at least partly accounted for by the lesser attention directed there by entomologists (Limbert, 1985b, 1986), but may also serve as a further example of the ecological distinctness of the two moorlands, as emphasised by Skidmore (1997).

In succeeding decades, the fate which visited Thorne Moors was repeated elsewhere, and now the White-faced Dragonfly, alwàys restricted in its number of known locations (Lucas 1900), has become vulnerable in all parts of England (Merritt *et al.,* 1996). As an insect of *Sphagnum*-rich mire pools, it has especially suffered from seral change, habitat loss and – latterly – drought. Fortunately, within the right situation, its breeding habitat can be artificially manipulated to increase its numbers, as for example at Chartley Moss NNR, Staffordshire (Bailey, 1992), and Fenns, Whixhall & Bettisfield Mosses NNR, Shropshire/Clwyd (Brooks, 1997). However, Thorne was the sole haunt of the species in eastern England, including the whole of Yorkshire (Merritt *et al.* 1996). A probable record of coastal immigration at Scarborough in 1900 (Imms, 1900) is considered invalid (Limbert 1985a; Merritt *et al.,* 1996). As there is no certain evidence to suggest that this is a migratory dragonfly in Britain (Merritt *et al.,* 1996), Brooks (1997), writing of Thorne Moors as an erstwhile eastern outpost of the species, is justified in commenting that it 'is unlikely to recolonise the site naturally because there are no other populations nearby'. The White-faced Dragonfly is one of a trio whose entire recorded presence in Yorkshire is restricted to the Doncaster district, during the period 1823-1911. The remaining two are the Downy Emerald (*antea*) and the Scarce Chaser *Libellula fulva* Müll. (Odonata: Libellulidae), the latter being known at Shirley Pool, Askern, 1888-1911 (Limbert, 1985).

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NOTES ON THE MARSH FLIES (DIPTERA: SCIOMYZIDAE) OF YORKSHIRE

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Sciomyzidae are small to medium-sized Acalypterate flies of a general brownish colour; some species have spotted or infuscated wings. The larvae feed as aquatic predators or terrestrial parasitoids (and/or predators) of pulmonate snails and pea mussels, and a few attack slugs or consume snail eggs (Rozkošny 1995).

In view of the larval habits it is not surprising that many sciomyzids are to be found in damp or marshy localities, although a few species occur in dry habitats. They were popularly known as 'marsh flies' before their association with snails was fully realised; nowadays they are sometimes colloquially referred to as 'snail-killing flies'.

The Sciomyzidae is one of several families of diptera which can be useful in assessing the quality and conservation value of wetland habitats, especially fen and other wetlands of a mesotrophic or calcareous nature (Falk 1992).

Following the modern concept of the Sciomyzidae (Rozkošny 1995), there are currently 505 world species and the British list, including the genus *Pelidnoptera*, now considered to be representative of the Phaeomyiidae, stands at 67 (Kloet & Hincks 1975, with additions), of which 57 are recorded in Watsonian Yorkshire. Of the Yorkshire species, 11 are provisionally classed as Red Data Book species and 13 are Nationally Notable (Falk 1991).

The distribution accounts which follow relate to these species and to others which, although not considered nationally scarce, nevertheless appear to be regionally uncommon, or are of particular interest. They are based upon the records of the Yorkshire Naturalists' Union which I have recently up-dated; full details of each record are not quoted in all cases but these are available on request.

Pelidnoptera: the two British species of this genus, which is now placed in the family Phaeomyiidae (Vala *et al.* 1990), occur in Yorkshire. They are included in this paper in view of the historic inclusion of the genus in the Sciomyzidae. *P. fuscipennis* (Mg.) is widespread in Yorkshire but it appears to be scarce in the west of the county; it is parasitic on millepedes (Vala *et al.* 1990).

P. nigripennis (Fab.) Nb. Very local with only five reported localities, one each in vice-counties 61, 64 and 65 and two in vice-county 62; all are post-1967, the most recent being Allerthorpe Common (VC61) 1990 and High Spring Wood, Swaledale (VC65) 1993.

Salticella fasciata (Mg.) RDB2. Known in Britain from only five post-1960 sites, all of them coastal (Falk 1991), this species was recorded at Spurn by C. A. Cheetham 25/6/1928. It has not been found since and it may now be extinct in Yorkshire.

Colobaea bifasciella (Fall.) Nb. Reported from only three Yorkshire localities: Thornton Ellers (part of the Lower Derwent Valley NNR) 16/6/87 and Hornsea Mere 5/9/96 (both VC61) (both R.C.), and Blacktoft Sands (VC63) where a specimen emerged 19/5/74 ex *Lymnaea* (*Gaba*) *truncatula* L. (P. Skidmore). Mr A. Norris informs me (*pers. comm.*), that *L. truncatula* is a widespread and abundant snail in damp localities and it is the main host of the liver-fluke which affects sheep.

C. distincta (Mg.) Nb. First recorded in Yorkshire at Hotham Carrs (VC61) in 1953, there are only two further county records, Went Valley (VC63) 18/6/70 and Wheldrake Ings (VC61) 28/7/90.

C. punctata (Lundb.) Nb. First reported in Yorkshire from the banks of the River Wharfe at Otley (VC64) 19/8/84 (P.S.), and at Thrybergh Reservoir (VC63) the following year, there have been four records since 1994, one at Rawcliffe Meadows, York (VC62), and from three localities in the Lower Derwent Valley NNR (VC61). At Rawcliffe Meadows large numbers were found in late July 1995 at the muddy margins of a field pond which was constructed a few years earlier as part of the development of this local nature park. In 1996 it was taken at Burdale pond (VC61) in the Wolds (P. J. Chandler).

Pherbellia argyra Verbeke RDB2. The sole Yorkshire record, from Bentley Common (VC63) swept from *Glyceria* etc. on the edge of a pond 23/6/76 (P.S.), is one of only six post-1960 British records for this species (Falk 1991).

P. brunnipes Mg. Nb. The first record of this species in Yorkshire was from Wentworth (VC63) 7/7/21. There was no further report until 3/7/80 when a pair was collected by a shallow muddy pond in Sandall Beat Wood, Doncaster (VC63). A single male was taken by the River Wharfe, Otley (VC64) 19/8/84 (P.S.), and since 1990 specimens have been found at three sites in the Lower Derwent Valley NNR and also at Skipwith Common (all VC61).

P. dorsata (Zett.) Nb. As in the case of the previous species, the first Yorkshire record was from Wentworth (VC63) 7/7/21, followed by Malham Tarn (VC64) in the late 1950s. It was next reported from Wheldrake Ings (VC61) in 1990, from Rawcliffe Meadows, York (VC62) in 1995 and from two further localities in the Lower Derwent Valley NNR (VC61) in the same year. In 1996 it was found at Burdale (VC61).

P. griseola (Fall.) Nb. Millington (VC61) provided the first county record 1/8/36, the next being from the edge of the colliery at Thorne Moors (VC63) 25/7/76. There have been no further records since and the one published for Wheldrake Ings (VC61) (Crossley 1993) was based on an erroneous identification and should be deleted.

P. knutsoni Verbeke RDB3. A single female was taken at a disused chalk quarry near Bishop Wilton (VC61) 20/8/96 (R.C.). This constitutes the first record for Yorkshire; about half a dozen sites are known in Britain, all of which appear to be dry habitats (Falk 1991). I am obliged to Mr J. H. Cole for identifying the specimen.

P. nana (Fall.) Nb. The only Yorkshire record for this nationally widespread, though local, species is from Malham Tarn (VC64) post-1970, but with no further details.

Pteromicra leucopeza (Mg.) RDB2. As with the previous species, the only Yorkshire record is from Malham Tarn (VC64) post-1970, but with no further details.

Sciomyza dryomyzina Zett. RDB2. This species is reported from eight sites in Britain of which only three are post-1960 records (Falk 1991). The single Yorkshire record is from Bubwith (VC61) 1925. A number of rare insects formerly reported from 'Bubwith' have been found in recent years in the winter-flooded hay meadows of the Lower Derwent valley and it is possible that this species may survive somewhere in the area.

S. simplex Fall. Nb. Reported from Allerthorpe in 1928, and at Bubwith (also probably in the 1920s), (both VC61), there were no further Yorkshire records for this nationally widespread, though very local, species until 1980, when a single female was found in a water trap at Blacktoft Sands (VC63); the following year the species was taken in a bed of *Glyceria* at Bubwith Ings (VC61). It has been found since 1990 at Wheldrake Ings and also, in 1996, at Hornsea Mere (both VC61).

Tetanura pallidiventris Fall. Locally distributed in Yorkshire, there are as yet no records for VCs 61 and 63. The majority of reports are from calcareous woodlands; the fly appears to be associated with extensive stands of *Mercurialis perennis* L. (Dog's Mercury). According to Rozkošny (1984), females lay eggs directly on the soft part of terrestrial snails, using their unique flattened and partly twisted ovipositor.

Antichaeta analis (Mg.) RDB3. Falk (1991) lists nine post-1960 widely scattered localities in Britain, most of which are high-quality fen sites. The first Yorkshire record was a male collected at Askham Bog (VC64) 12/5/93, and on 6/5/95 a pair was taken at Wheldrake Ings (VC61) in the fen near the wind-pump (both records R.C).

A. brevipennis (Zett.) RDB2. The only Yorkshire record for this species is from Denaby Ings (VC63), 26/8/67 leg. C. Devlin, det. P.S. This is the most northerly of only seven post-1960 British sites listed in Falk (1991). There has been a subsequent (1993) record from West Cumbria (Mawdsley 1996).

A. obliviosa End. RDB2. The first British specimen was found in Brampton Wood, Cambridgeshire (VC31) in 1987 (Cole 1988), and further examples have been found subsequently at three other sites in the same vice-county (Falk 1991). A single male was taken in the fen near the wind-pump at Wheldrake Ings (VC61) 5/5/95 (R.C.). On the

following day I returned to the site to search for further specimens but was not successful. Instead, however, *A. analis* was found; the presence of these two nationally rare species in the same location at the same time is quite remarkable.

Coremacera marginata (Fab.) Records for this distinctive species are concentrated in the east of the county, the majority being in VC61; the most westerly Yorkshire sites are Wass (VC62) and Copmanthorpe (VC64). The larvae are parasitoids of various terrestrial snails and the species often occurs in relatively dry habitats (Rozkošny 1984).

Dichetophora finlandica Verbeke RDB3. Prior to 1986 this species was recorded from only two Yorkshire localities: Sprotborough (VC63) 1965, and Hotham Carrs (VC61) 1972. Since 1986 there have been records from Thornton Ellers (Lower Derwent Valley NNR) (VC61); Keld Head Springs, Pickering and Rawcliffe Meadows, York (both VC62); Askham Bog, York (VC64); Carlton Marsh, Barnsley (VC63). This species was separated from *D. obliterata* (Fab.) in 1964 (see comments below).

D. obliterata (Fab.). Except for a 1972 record from Sherburn Willows (VC64), the remaining seven county records are from East Yorkshire (VC61), the earliest being Barmby Moor 1931, and the only one in recent years being from Wharram Quarry 1990. It is possible that some of the pre-1964 records could refer to *D. finlandica* (see above).

Dictya umbrarum (L.) Nb. Malham Tarn Fen and Thieves Moss (both VC64) are two of a cluster of sites within five adjacent 10km squares in the Craven uplands to which this species appears to be confined in Yorkshire. A record for Austwick, probably in the 1920s, is the earliest, the most recent one being Thieves Moss on the occasion of the Y.N.U. meeting at Moughton in 1983. The distribution of this species nationally is typically 'Highland Britain', with outlying populations in New Forest and Dorset bogs (Falk 1991).

Ectinocera borealis (Zett.) RDB3. A boreo-montane species in Europe, the majority of British records are from Scotland (Falk 1991). It was first recorded in Yorkshire at Austwick by C. A. Cheetham in 1926 and also by him at Grass Woods (both VC64). It has since been found at Malham Tarn (VC64), most recently in 1983 (Falk 1992), and at High Spring Wood, Swaledale (VC65) 19/5/93 (R.C.).

Ilione lineata (Fall.) An undated record from Pilmoor (VC62), probably from the 1920s, and another from North Cave (VC61) 11/7/53 were the only Yorkshire records until specimens were found at Thorne Moors (VC63) in 1969. In recent years the species has been found at two sites within the Lower Derwent Valley NNR (VC61), and at ponds on Strensall Common (VC62).

Limnia unguicornis (Scop.) Records for this species are widespread in VCs 61, 62 and 64, with a few in VC63 and one in VC65. However, the description of a closely similar species, *L. paludicola* Elberg in 1965 throws some doubt on the validity of records of *L. unguicornis* prior to that date in the case of those specimens which have not been re-examined. Examples of authentic *L. unguicornis* and *L. paludicola* have been found in Yorkshire since 1965 and indications are that both species will prove to be locally distributed across the county.

Psacadina verbekei Rozkošný Nb. The first county record was from Shirley Pool (VC63) in 1975. Since then it has been recorded from about a dozen widely scattered marshy or other wetland sites in all vice-counties except 65. If distribution nationally follows the pattern in Yorkshire, the current rarity status of this species will probably be removed in a future review.

Sepedon sphegea (Fab.) An undated record from Pilmoor (VC62), probably in the 1920s, remained the only one for the county until 1970, when the species was reported at West Ings, Stainforth (VC63). Thereafter it was found at a further four sites in the Doncaster area (VC63), the last being in 1983. Since 1994 it has been found in VC61 at Skipwith Common and two sites in the Lower Derwent Valley NNR, and in VC62 at Strensall Common and Rawcliffe Meadows, York. This is a relatively large and distinctive fly which can be identified in the field, and the post-1990 occurences point to a possible extension of range.

S. spinipes (Scop.) This is a scarce and localised Yorkshire species with a cluster of recorded sites in the Doncaster area (VC63) from 1968-86 (P.S.). In 1994 and 1996 specimens found at ponds on Strensall Common (VC62) probably represent a recent extension of range since this species, like the last, is distinctive and easily recognised and it is unlikely to have been overlooked in the past.

Tetanocera freyi Stack. RDB3. Separated from the closely similar and fairly common *T. silvatica* Mg. in 1963, *T. freyi* remained unreported in Yorkshire until 1996 when a female was taken on 14 July at Seivedale (Dalby Forest), (VC62) (C. M. Drake). Falk (1991) lists eleven widely dispersed sites throughout Britain.

T. fuscinervis (Zett.) Recorded from Austwick (VC64) in 1922, Fylinghall (VC62) in 1928 and Malham Tarn (VC64) in 1959, there were no more reports for this species until 1980, since when it has been recorded in a further eight widely dispersed sites in upland areas of VCs 62, 64 and 65.

T. phyllophora Melander Nb. First recorded in the county at Ashberry (VC61) 27/6/71, this species has subsequently been recorded at three further sites in the North York Moors National Park and also at Askham Bog (VC64). It appears to be genuinely scarce in Yorkshire.

T. punctifrons Rond. Nb. First recorded in the county at Elleron (VC62) 8/8/90 (A. Grayson), the species was subsequently taken in the vicinity of a marsh on the site of a former pond at Beningborough Park (VC62) in 1991 (R.C.), and a further specimen was found at a field drain near the River Foulness, Eastrington (VC61) 20/7/92 (R.C.). In 1996 it was reported from Sand Dale and Wheeldale Road (both VC62) (C. M. D.).

Other species currently recorded in Yorkshire are listed below. They are mostly widely distributed and fairly common; broad distribution patterns are indicated as appropriate.

Pherbellia albocostata (Fall.) all vice-counties
P. cinerella (Fall.) all vice-counties
P. dubia (Fall.) all vice-counties
P. pallidiventris (Fall.) all vice-counties except 61; local
P. schoenherri (Fall.) all vice-counties; local
P. scutellaris (Roser) all vice-counties except 61
P. ventralis (Fall.) all vice-counties
Pteromicra angustipennis (Staeg.) vice-counties 61, 63, 64; local
Elgiva cucularia (L.) all vice-counties except 65
E. solicita Harr. mostly in vice-counties 61 and 63; single localities in VC's 62 and 64
Euthycera fumigata (Scop.) all vice-counties
Hydromya dorsalis (Fab.) all vice-counties
Ilione albiseta (Scop.) all vice-counties
Pherbina coryleti (Scop.) all vice-counties
Renocera pallida (Fall.) all vice-counties
R. stroblii Hendel all vice-counties
Tetanocera arrogans (Mg.) all vice-counties except 65
T. elata (Fab.) all vice-counties; common
T. ferruginea Fall. all vice-counties; common
T. hyalipennis Roser all vice-counties; common
T. robusta Lw. all vice-counties except 65
T. silvatica Mg. vice-counties 62, 64, 65
Trypetoptera punctulata (Scop.) all vice-counties.

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Y.N.U. Recorder for the section of Diptera in which the Sciomyzidae is placed is Mr A. Grayson, and I am gratetul to him for access to the records in order to produce this paper on a family which has been a peripheral interest of mine for many years.

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RECORDER'S SIXTH REPORT OF THE ACULEATE HYMENOPTERA IN WATSONIAN YORKSHIRE

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Since my last report (Archer, 1994) two new species have been found in Watsonian Yorkshire. In the following section, collectors are identified by the initials: M. E. Archer (MEA), L. Auckland (LA), J. D. Coldwell (JDC), R. Crossley (RC), S. Foster (SF), A. Grayson (AG), S. J. Hayhow (SJH), A. S. Lazenby (ASL), R. Morris (RM), S. M. Saxton (SMS), D. Whiteley (DW) and P. Winter (PW).

The new species are: *Spilomena differens* Bluthgen (Clough Wood, SE20, Aug. 1994, July 1995, JDC) and the superwasp *Dolichovespula media* (Retzius). *D. media* was first recorded in 1994 by RC (Duncombe Park, SE68, June) and JDC (Barnsley, SE30, July). During 1995 it was recorded by MEA (York, SE65, two records Aug.; Thixondale, SE86, Aug.; Tollerton, SE56, Aug.; Horse Dale, SE85, March; Malton, SE97) and LA (Staxton, TA07, Aug.). During 1996 it was recorded by PW (Muston, TA07, Sept.) and RM (Rushy Moor, SE5 1, July).

Other important records are: *Sapyga clavicornis* (Linn.). Caydale, SE58, June 1995, MEA; Stutton, SE44, June 1996, MEA. *Crossocerus styrius* (Kohl). Woolley Wood, SK39, July 1994, DW. *C. walkeri* (Shuckard). Little Don Valley, SE10, June 1995, JDC. *Ectemnius sexcinctus* (Fab.). Sheffield, SK38, July, Aug. 1994, ASL; Kirbymoorside, SE68, June 1994, AG; Manvers Colliery, SE40, July 1995, JDC; Bradford, SE13, June, July 1995, SMS; Keighley, SE04, July 1995, SMS; Sheffield, SK38, June 1995, ASL;

Ringhay Wood, SE43, June 1996, MEA; Carlton Marsh, SE31, Aug. 1996, JDC. *Spilomena beata* Bluthgen. Wycliffe, NZ11, July 1983, SJH; Bretton Lakes, SE21, July 1996, JDC. *Argogorytes fargei* (Shuckard). Stutton, SE44, June 1994, MEA; Beningbrough, SE55, June 1995, July 1996, MEA; Fulford Ings, York, SE64, June 1995, MEA. *Cerceris arenaria* (Linn.). Rossington Bridge, SK69, July 1994, MEA. *Hylaeus brevicornis* Nylander. Lindrick Dale Quarry, SK58, June 1995, MEA; Rossington Bridge, SK69, June 1995, MEA. *H. signatus* (Panzer). Manvers Colliery, SE40, Oct. 1994, July 1995, JDC. *Andrena ocreata* (Christ). Gundale, SE88, April & June 1994, MEA. *Sphecodes puncticeps* Thomson. Sandall Beat Wood, SE60, July 1992, SF; Thornton Ellers, SE74, Aug. 1994, MEA; Barnby Dun, SE60, June 1995, MEA; Rossington Bridge, SK69, June 1995, MEA; Stutton, SE44, June 1996, MEA. *Coelioxys rufescens* Lepeletier & Serville. Manvers Colliery, SE40, July 1995 & 1996, JDC. *Nomada flava* Panzer. Rossington Bridge, SK69, female, June 1995, MEA.

Computation of the Solitary Wasp Records

The 5691 records of the solitary wasp species up to the 1996 season have been incorporated into an electronic data bank. Since each record can consist of up to 14 parts or fields, then 79,674 fields have been visited. A record is a specimen differing in one of the following three variables: name, sex and day of capture or observation. The distribution of records among the solitary wasp families is as follows: Chrysididae (475 records), Tiphiidae (9), Mutillidae (109), Sapygidae (32), Pompilidae (748), Eumenidae (680), Sphecidae (3638).

Regional Quality Scoring System

Archer (1993) developed a Yorkshire or regional quality scoring system, with solitary wasp species ranked according to the number of localities in which each species was found. A locality was defined by its 1km. grid square, and it was assumed that different localities would not have the same 1km. grid reference. For most species this assumption has been supported, but a few common species have ben found in more localities than 1km. grid squares (Table 1). Thus the same locality may be known by more than one name, or, particularly in urban areas, different localities are found in the same 1km. square. To overcome this problem the solitary wasp species now have been ranked by the number of 1km. squares in which each is found.

TABLE 1

The regional or Watsonian Yorkshire statuses of the solitary wasp species

Status	No. Species	No. 1km x 1km squares	No. localities
Rare	35	1–6	1–6
Occasional	30	7–15	7–15
Frequent	33	16–33	16–34
Common	33	34–87	35–94

The 131 species of solitary wasps have been divided into four status categories (Table 1); for example in Yorkshire, rare species are those found in up to six 1km. squares. The rare list contains four species (*Ceropales maculata* (Fab.), *Ectemnius lituratus* (Panzer), *Podalonia affinis* (Kirby), and *Mellinus crabroneus* (Thunberg)) which now are extinct in Yorkshire, and two species *Tiphia femorata* Fab. and *Eumenes papillarius* (Christ)) which were probably brought accidentally into the county by humans, and, after having been recorded once, have become extinct there.

Species Awaiting Confirmation

There are a further four species of solitary wasps for which voucher specimens have not been found. Confirmation with specimens is needed before these species can be accepted. For three of these species (*Hedychridium roseum* (Latreille in Coquebert), *Arachnospila consobrina* (Dahlbom) and *Crabo scutellatus* (Scheven)) confirmation with new material is not possible since the current British distribution of these species are remote from Yorkshire. The fourth species, *Cleptes nitidulus* (Fab.), may be found in Yorkshire, as it is known from Lancashire. R. A. Eades recently passed to me a male *C. scutellatus* found dead at Goole on 17 June 1992 on the ship Jaroslaw which had come from Poland.

Species Split

The solitary wasp *Tachysphex unicolor* has been split into two species. All the Yorkshire specimens are *T. nitidus* (Spinola).

Archival Material

Four copies of the paper records of the solitary wasp and bee species, up to the season of 1994 have been produced. One copy has been deposited in the archives at Sheepscar, Leeds and one copy at Keighley museum. The other two copies are retained by myself. All the record sheets and books I received from J. H. Flint, and the Fordham Cards, also have been deposited at Sheepscar in the archives. I have made photocopies of the Fordham cards for my use.

References,

Archer, M. E. (1993). Recorder's fourth report on the aculeate Hymenoptera in Watsonian Yorkshire and the development of a quality scoring system. *Naturalist* **118**: 13-15.

Archer, M. E. (1994). Recorder's fifth report on the aculeate Hymenoptera in Watsonian Yorkshire. *Naturalist* **119**: 73-77.

BOOK REVIEWS

Geography: Realms, Regions and Concepts by **H. J. de Blij and P. O. Muller**. Pp. xxvii + 613, with 133 colour photographs and 176 full colour maps. 8th edition. John Wiley. 1997. £23.95 hardback.

This archetypal American textbook claims to provide 'an information highway to geographical literacy' and to present 'a geographical perspective on the transforming world' by establishing a framework of geographical understanding based upon approximately 150 geographical concepts. It endeavours to provide a concise yet comprehensive global picture of the world's major human realms and regions. Having set such a challenging target it is almost inevitable that there will be at least a few areas of weakness, such as overgeneralisation and outdated information; for example, the map of West Africa still shows the Freetown to Pendembu railway line even though this was closed twenty-five years ago. However, despite a few failings, the work provides an informative and perceptive view of the events that are shaping the human geography of the contemporary world and sets them into a useful conceptual framework of geographical realms.

An introductory chapter which contains useful maps of the world's crustal plates, precipitation, climatic belts, vegetation types and landforms provides an outline of the Earth's physical attributes. Further maps showing the distribution of population and of economic status are then integrated with the physical information to establish twelve 'global realms'. Twelve chapters are then devoted to providing details and sample studies of areas within each of these realms. An interesting feature of the systematic coverage is

that a brief history is provided for each realm, which complements the geographic and cultural information and helps to account for many of its distinctive attributes.

Inevitably, in a book of this type, information is presented in simplified manner using 'broad brush strokes'. The United Kingdom is divided into five subregions: 'Affluent Southern England; Stagnant Northern England; Intractible Wales; Individualistic Scotland and Embattled Northern Ireland'! About a hundred words are devoted to each region. Whilst this conciseness may be necessary, the reasoning behind some concepts is not always clear; for example, it is stated that Liverpool has 'seen its docks all but abandoned' and 'its hopes now rest on a thread: the Channel Tunnel and the link it provides to burgeoning Western Europe'.

Provided that one is willing to accept such sweeping generalisations and to learn that 'the United Kingdom has an area about the size of Oregon', this book has a lot to offer the British reader as it presents a non-European view of the world in clear and striking terms and is effective in highlighting the rapid changes which have transformed the human geography of the globe in the last twenty years.

DEC

The Tropical Rain Forest: an Ecological Study by **P. W. Richards**. Pp. xxiii + 575, with numerous line drawings, b/w photographic plates and tables. 2nd edition. Cambridge University Press. 1996. £90.00 hardback, £32.50 paperback.

This long-awaited revision of such an influential work lives up to the high standards of its predecessor, published in 1952 (and reprinted, with minor correction and additions, in 1957, 1964, 1966, 1972 and 1976). Unfortunately, the author, Professor Paul Richards CBE (1908-1995), died before its publication, but fortunately for us not before he had completed the manuscript (by 1994) and seen it through the press.

Since the first edition, the ecological stability of the tropical rain forests of the world has been lost and these delicate ecosystems are no longer in equilibrium. Large tracts of this important major biome have been devastated and for many tropical countries they have been lost or reduced to refugia. Such changes are clearly documented in this scholarly work. The present edition has been completely rewritten, with expanded chapters, replacement chapters on climate, microclimate and hydrology (by R. P. D. Walsh) and on soil (by I. C. Baillie), and a new appendix on the application of numerical methods in rain forests (by P. Greig-Smith). The whole work, almost encyclopaedic in its compass, is excellently supported by an extensive list of references (38 pp.), an index of plant names (18 pp.) and detailed general index.

A worthy testament to a gifted botanist whom this reviewer had the pleasure to know and the priviledge to collaborate with over many years.

MRDS

The Correpondence of Charles Darwin. Volume 10. 1862 edited by **Frederick Burkhardt, Duncan M. Porter, Joy Harvey and Jonathan R. Topham**. Pp. xl + 936, with 10 pp. b/w photographic plates. Cambridge University Press. 1997. £50.00 hardback.

The latest volume in this monumental enterprise and a fitting tribute to this remarkable man. His enormous output of correspondence has been carefully gathered together and the detail of supporting material, in terms of interpretive notes, and bibliographical and biographical information, maintains the very high standard attained in previous volumes. The letters in the current volume, many previously unpublished, are mainly concerned with Darwin's botanical work, but also include numerous reactions to *The Origin of Species* from correspondents worldwide, besides revealing his very considerable concern for family matters.

MRDS

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